

REFERENCES

1. Iijima, S.; Ajayan, P. M.; Ichihashi, T., Growth model for carbon nanotubes. *Physical review letters* **1992**, *69* (21), 3100-3103.
2. Kroto, H. W.; Heath, J. R.; O'Brien, S. C.; Curl, R. F.; Smalley, R. E., C-60 - BUCKMINSTERFULLERENE. *Nature* **1985**, *318* (6042), 162-163.
3. Smalley, R. E., Self-assembly of the fullerenes. *Accounts of chemical research* **1992**, *25* (3), 98-105.
4. Rietmeijer, F. J. M.; Rotundi, A.; Heymann, D., C60 and Giant Fullerenes in Soot Condensed in Vapors with Variable C/H₂ Ratio. *Fullerenes, Nanotubes and Carbon Nanostructures* **2004**, *12* (3), 659-680.
5. Novoselov, K. S.; Geim, A. K.; Morozov, S. V.; Jiang, D.; Zhang, Y.; Dubonos, S. V.; Grigorieva, I. V.; Firsov, A. A., Electric Field Effect in Atomically Thin Carbon Films. *Science* **2004**, *306* (5696), 666-669.
6. Singh, V.; Joung, D.; Zhai, L.; Das, S.; Khondaker, S. I.; Seal, S., Graphene based materials: Past, present and future. *Progress in Materials Science* **2011**, *56* (8), 1178-1271.
7. Wang, S.; Tang, L. A. I.; Bao, Q.; Lin, M.; Deng, S.; Goh, B. M.; Loh, K. P., Room-Temperature Synthesis of Soluble Carbon Nanotubes by the Sonication of Graphene Oxide Nanosheets. *Journal of the American Chemical Society* **2009**, *131* (46), 16832-16837.
8. Ugarte, D., Curling and closure of graphitic networks under electron-beam irradiation. *Nature* **1992**, *359* (6397), 707-709.
9. Liu, W.; Miao, Y.; Meng, Q., Synthesis of Onion-Like Fullerenes by Arc Discharge in Non-Toxic Organic Liquid. *Integrated Ferroelectrics* **2012**, *138* (1), 77-82.
10. Yudasaka, M.; Iijima, S.; Crespi, V., Single-Wall Carbon Nanohorns and Nanocones. In *Carbon Nanotubes*, Springer Berlin Heidelberg: 2008; Vol. **111**, pp 605-629.
11. Kasuya, D.; Yudasaka, M.; Takahashi, K.; Kokai, F.; Iijima, S., Selective Production of Single-Wall Carbon Nanohorn Aggregates and Their Formation Mechanism. *The Journal of Physical Chemistry B* **2002**, *106* (19), 4947-4951.
12. Falcao, E. H. L.; Wudl, F., Carbon allotropes: beyond graphite and diamond. *Journal of Chemical Technology & Biotechnology* **2007**, *82* (6), 524-531.
13. Geim, A. K.; Novoselov, K. S., The rise of graphene. *Nature materials* **2007**, *6* (3), 183-91.



137614976

14. Muszynski, R.; Seger, B.; Kamat, P. V., Decorating Graphene Sheets with Gold Nanoparticles. *The Journal of Physical Chemistry C* **2008**, *112* (14), 5263-5266.
15. Hancock, Y., The 2010 Nobel Prize in physics—ground-breaking experiments on graphene. *Journal of Physics D: Applied Physics* **2011**, *44* (47), 473001.
16. Sengupta, R.; Bhattacharya, M.; Bandyopadhyay, S.; Bhowmick, A. K., A review on the mechanical and electrical properties of graphite and modified graphite reinforced polymer composites. *Progress in Polymer Science* **2011**, *36* (5), 638-670.
17. Shojaie, M.; Golestanian, H., Effects of interface characteristics on mechanical properties of carbon nanotube reinforced polymer composites. *Materials Science and Technology* **2011**, *27* (5), 916-922.
18. Wang, X.; Zhi, L.; Tsao, N.; Tomović, Z.; Li, J.; Müllen, K., Transparent Carbon Films as Electrodes in Organic Solar Cells. *Angewandte Chemie* **2008**, *120* (16), 3032-3034.
19. Kataura, H.; Maniwa, Y.; Abe, M.; Fujiwara, A.; Kodama, T.; Kikuchi, K.; Imahori, H.; Misaki, Y.; Suzuki, S.; Achiba, Y., Optical properties of fullerene and non-fullerene peapods. *Appl Phys A* **2002**, *74* (3), 349-354.
20. Ni, G.-X.; Zheng, Y.; Bae, S.; Tan, C. Y.; Kahya, O.; Wu, J.; Hong, B. H.; Yao, K.; Özyilmaz, B., Graphene-Ferroelectric Hybrid Structure for Flexible Transparent Electrodes. *ACS Nano* **2012**, *6* (5), 3935-3942.
21. Liu, Y.; Yu, D.; Zeng, C.; Miao, Z.; Dai, L., Biocompatible Graphene Oxide-Based Glucose Biosensors. *Langmuir* **2010**, *26* (9), 6158-6160.
22. Xu, L. R.; Bhamidipati, V.; Zhong, W.-H.; Li, J.; Lukehart, C. M.; Lara-Curzio, E.; Liu, K. C.; Lance, M. J., Mechanical Property Characterization of a Polymeric Nanocomposite Reinforced by Graphitic Nanofibers with Reactive Linkers. *Journal of Composite Materials* **2004**, *38* (18), 1563-1582.
23. Huang, Z. P.; Wang, D. Z.; Wen, J. G.; Sennett, M.; Gibson, H.; Ren, Z. F., Effect of nickel, iron and cobalt on growth of aligned carbon nanotubes. *Applied Physics A: Materials Science & Processing* **2002**, *74* (3), 387-391.
24. Hummers, W. S.; Offeman, R. E., Preparation of Graphitic Oxide. *Journal of the American Chemical Society* **1958**, *80* (6), 1339-1339.
25. Higginbotham, A. L.; Kosynkin, D. V.; Sinitskii, A.; Sun, Z.; Tour, J. M., Lower-defect graphene oxide nanoribbons from multiwalled carbon nanotubes. *ACS Nano* **2010**, *4* (4), 2059-69.
26. Dreyer, D. R.; Park, S.; Bielawski, C. W.; Ruoff, R. S., The chemistry of graphene oxide. *Chemical Society Reviews* **2010**, *39* (1), 228-240.



27. Cai, W.; Piner, R. D.; Stadermann, F. J.; Park, S.; Shaibat, M. A.; Ishii, Y.; Yang, D.; Velamakanni, A.; An, S. J.; Stoller, M.; An, J.; Chen, D.; Ruoff, R. S., Synthesis and Solid-State NMR Structural Characterization of ^{13}C -Labeled Graphite Oxide. *Science* **2008**, *321* (5897), 1815-1817.
28. Wang, C.; Li, J.; Amatore, C.; Chen, Y.; Jiang, H.; Wang, X.-M., Gold Nanoclusters and Graphene Nanocomposites for Drug Delivery and Imaging of Cancer Cells. *Angewandte Chemie International Edition* **2011**, *50* (49), 11644-11648.
29. Wick, P.; Manser, P.; Limbach, L. K.; Dettlaff-Weglikowska, U.; Krumeich, F.; Roth, S.; Stark, W. J.; Bruinink, A., The degree and kind of agglomeration affect carbon nanotube cytotoxicity. *Toxicology Letters* **2007**, *168* (2), 121-131.
30. Shen, M.; Wang, S. H.; Shi, X.; Chen, X.; Huang, Q.; Petersen, E. J.; Pinto, R. A.; Baker, J. R.; Weber, W. J., Polyethyleneimine-Mediated Functionalization of Multiwalled Carbon Nanotubes: Synthesis, Characterization, and In Vitro Toxicity Assay. *The Journal of Physical Chemistry C* **2009**, *113* (8), 3150-3156.
31. Hu, W.; Peng, C.; Luo, W.; Lv, M.; Li, X.; Li, D.; Huang, Q.; Fan, C., Graphene-Based Antibacterial Paper. *ACS Nano* **2010**, *4* (7), 4317-4323.
32. Lacerda, L.; Pastorin, G.; Gathercole, D.; Buddle, J.; Prato, M.; Bianco, A.; Kostarelos, K., Intracellular Trafficking of Carbon Nanotubes by Confocal Laser Scanning Microscopy. *Advanced Materials* **2007**, *19* (11), 1480-1484.
33. Heister, E.; Neves, V.; Tilmaciu, C.; Lipert, K.; Beltrán, V. S.; Coley, H. M.; Silva, S. R. P.; McFadden, J., Triple functionalisation of single-walled carbon nanotubes with doxorubicin, a monoclonal antibody, and a fluorescent marker for targeted cancer therapy. *Carbon* **2009**, *47* (9), 2152-2160.
34. Ghosh, D.; Chandra, S.; Chakraborty, A.; Ghosh, S. K.; Pramanik, P., A Novel Graphene Oxide-Para Amino Benzoic Acid Nanosheet as Effective Drug Delivery System to Treat Drug Resistant Bacteria. *International Journal of Pharmaceutical Sciences and Drug Research* **2010**, *2* (2), 127-133.
35. Yang, X.; Zhang, X.; Liu, Z.; Ma, Y.; Huang, Y.; Chen, Y., High-Efficiency Loading and Controlled Release of Doxorubicin Hydrochloride on Graphene Oxide. *The Journal of Physical Chemistry C* **2008**, *112* (45), 17554-17558.
36. Liu, Z.; Chen, K.; Davis, C.; Sherlock, S.; Cao, Q.; Chen, X.; Dai, H., Drug Delivery with Carbon Nanotubes for In vivo Cancer Treatment. *Cancer Research* **2008**, *68* (16), 6652-6660.
37. Schedin, F.; Geim, A. K.; Morozov, S. V.; Hill, E. W.; Blake, P.; Katsnelson, M. I.; Novoselov, K. S., Detection of individual gas molecules adsorbed on graphene. *Nature materials* **2007**, *6* (9), 652-5.



38. Hu, H.; Wang, X.; Xu, C.; Wang, J.; Wan, L.; Zhang, M.; Shang, X., Microwave-Assisted Synthesis of Graphene Nanosheets–Gold Nanocomposites with Enhancing Electrochemical Response. *Fullerenes, Nanotubes and Carbon Nanostructures* **2011**, *20* (1), 31-40.
39. Chang, H.; Tang, L.; Wang, Y.; Jiang, J.; Li, J., Graphene Fluorescence Resonance Energy Transfer Aptasensor for the Thrombin Detection. *Analytical Chemistry* **2010**, *82* (6), 2341-2346.
40. Tung, V. C.; Chen, L.-M.; Allen, M. J.; Wassei, J. K.; Nelson, K.; Kaner, R. B.; Yang, Y., Low-Temperature Solution Processing of Graphene–Carbon Nanotube Hybrid Materials for High-Performance Transparent Conductors. *Nano Letters* **2009**, *9* (5), 1949-1955.
41. Ma, X.; Tao, H.; Yang, K.; Feng, L.; Cheng, L.; Shi, X.; Li, Y.; Guo, L.; Liu, Z., A functionalized graphene oxide-iron oxide nanocomposite for magnetically targeted drug delivery, photothermal therapy, and magnetic resonance imaging. *Nano Res.* **2012**, *5* (3), 199-212.
42. Ebbesen, T. W.; Ajayan, P. M., Large-scale synthesis of carbon nanotubes. *Nature* **1992**, *358* (6383), 220-222.
43. Thess, A.; Lee, R.; Nikolaev, P.; Dai, H.; Petit, P.; Robert, J.; Xu, C.; Lee, Y. H.; Kim, S. G.; Rinzler, A. G.; Colbert, D. T.; Scuseria, G. E.; Tomanek, D.; Fischer, J. E.; Smalley, R. E., Crystalline Ropes of Metallic Carbon Nanotubes. *Science* **1996**, *273* (5274), 483-7.
44. Dai, H., Carbon nanotubes: synthesis, integration, and properties. *Accounts of chemical research* **2002**, *35* (12), 1035-44.
45. Bethune, D. S.; Kiang, C. H.; De Vries, M. S.; Gorman, G.; Savoy, R.; Vazquez, J.; Beyers, R., Cobalt-catalysed growth of carbon nanotubes with single-atomic-layer walls. *Nature* **1993**, *363* (6430), 605-607.
46. Iijima, S.; Yudasaka, M.; Yamada, R.; Bandow, S.; Suenaga, K.; Kokai, F.; Takahashi, K., Nano-aggregates of single-walled graphitic carbon nano-horns. *Chemical Physics Letters* **1999**, *309* (3–4), 165-170.
47. Kong, J.; Cassell, A. M.; Dai, H., Chemical vapor deposition of methane for single-walled carbon nanotubes. *Chemical Physics Letters* **1998**, *292* (4–6), 567-574.
48. Dai, H.; Kong, J.; Zhou, C.; Franklin, N.; Tomblor, T.; Cassell, A.; Fan, S.; Chapline, M., Controlled Chemical Routes to Nanotube Architectures, Physics, and Devices. *The Journal of Physical Chemistry B* **1999**, *103* (51), 11246-11255.
49. Deck, C. P.; Vecchio, K., Prediction of carbon nanotube growth success by the analysis of carbon–catalyst binary phase diagrams. *Carbon* **2006**, *44* (2), 267-275.



50. Brodie, B. C., Sur le poids atomique du graphite. *Ann. Chim. Phys.* **1860**, *59*, 466-472.
51. Si, Y.; Samulski, E. T., Synthesis of water soluble graphene. *Nano Lett* **2008**, *8* (6), 1679-82.
52. Stankovich, S.; Dikin, D. A.; Dommett, G. H.; Kohlhaas, K. M.; Zimney, E. J.; Stach, E. A.; Piner, R. D.; Nguyen, S. T.; Ruoff, R. S., Graphene-based composite materials. *Nature* **2006**, *442* (7100), 282-6.
53. Stankovich, S.; Dikin, D. A.; Piner, R. D.; Kohlhaas, K. A.; Kleinhammes, A.; Jia, Y.; Wu, Y.; Nguyen, S. T.; Ruoff, R. S., Synthesis of graphene-based nanosheets via chemical reduction of exfoliated graphite oxide. *Carbon* **2007**, *45* (7), 1558-1565.
54. Park, S.; An, J.; Piner, R. D.; Jung, I.; Yang, D.; Velamakanni, A.; Nguyen, S. T.; Ruoff, R. S., Aqueous Suspension and Characterization of Chemically Modified Graphene Sheets. *Chemistry of Materials* **2008**, *20* (21), 6592-6594.
55. Lef, A.; He, H.; Forster, M.; Klinowski, J., Structure of Graphite Oxide Revisited. *The Journal of Physical Chemistry B* **1998**, *102* (23), 4477-4482.
56. Wang, G.; Yang, J.; Park, J.; Gou, X.; Wang, B.; Liu, H.; Yao, J., Facile Synthesis and Characterization of Graphene Nanosheets. *The Journal of Physical Chemistry C* **2008**, *112* (22), 8192-8195.
57. Cataldo, F.; Compagnini, G.; Patané, G.; Ursini, O.; Angelini, G.; Ribic, P. R.; Margaritondo, G.; Cricenti, A.; Palleschi, G.; Valentini, F., Graphene nanoribbons produced by the oxidative unzipping of single-wall carbon nanotubes. *Carbon* **2010**, *48* (9), 2596-2602.
58. Marcano, D. C.; Kosynkin, D. V.; Berlin, J. M.; Sinitskii, A.; Sun, Z.; Slesarev, A.; Alemany, L. B.; Lu, W.; Tour, J. M., Improved Synthesis of Graphene Oxide. *ACS Nano* **2010**, *4* (8), 4806-4814.
59. Chen, J.; Yao, B.; Li, C.; Shi, G., An improved Hummers method for eco-friendly synthesis of graphene oxide. *Carbon* **2013**, *64* (0), 225-229.
60. Liu, Z.; Robinson, J. T.; Sun, X.; Dai, H., PEGylated nanographene oxide for delivery of water-insoluble cancer drugs. *J Am Chem Soc* **2008**, *130* (33), 10876-7.
61. Yang, K.; Wan, J.; Zhang, S.; Zhang, Y.; Lee, S.-T.; Liu, Z., In Vivo Pharmacokinetics, Long-Term Biodistribution, and Toxicology of PEGylated Graphene in Mice. *ACS Nano* **2010**, *5* (1), 516-522.
62. Wen, H.; Dong, C.; Dong, H.; Shen, A.; Xia, W.; Cai, X.; Song, Y.; Li, X.; Li, Y.; Shi, D., Engineered Redox-Responsive PEG Detachment Mechanism in PEGylated Nano-Graphene Oxide for Intracellular Drug Delivery. *Small* **2012**, *8* (5), 760-769.



63. Shen, A.-J.; Li, D.-L.; Cai, X.-J.; Dong, C.-Y.; Dong, H.-Q.; Wen, H.-Y.; Dai, G.-H.; Wang, P.-J.; Li, Y.-Y., Multifunctional nanocomposite based on graphene oxide for in vitro hepatocarcinoma diagnosis and treatment. *Journal of Biomedical Materials Research Part A* **2012**, *100A* (9), 2499-2506.
64. Sahoo, N. G.; Bao, H.; Pan, Y.; Pal, M.; Kakran, M.; Cheng, H. K. F.; Li, L.; Tan, L. P., Functionalized carbon nanomaterials as nanocarriers for loading and delivery of a poorly water-soluble anticancer drug: a comparative study. *Chemical Communications* **2011**, *47* (18), 5235-5237.
65. Zhang, L.; Lu, Z.; Zhao, Q.; Huang, J.; Shen, H.; Zhang, Z., Enhanced Chemotherapy Efficacy by Sequential Delivery of siRNA and Anticancer Drugs Using PEI-Grafted Graphene Oxide. *Small* **2011**, *7* (4), 460-464.
66. Chen, B.; Liu, M.; Zhang, L.; Huang, J.; Yao, J.; Zhang, Z., Polyethylenimine-functionalized graphene oxide as an efficient gene delivery vector. *Journal of Materials Chemistry* **2011**, *21* (21), 7736-7741.
67. Pan, Y.; Bao, H.; Sahoo, N. G.; Wu, T.; Li, L., Water-Soluble Poly(N-isopropylacrylamide)-Graphene Sheets Synthesized via Click Chemistry for Drug Delivery. *Advanced Functional Materials* **2011**, *21* (14), 2754-2763.
68. Gao, J.; Bao, F.; Feng, L.; Shen, K.; Zhu, Q.; Wang, D.; Chen, T.; Ma, R.; Yan, C., Functionalized graphene oxide modified polysebacic anhydride as drug carrier for levofloxacin controlled release. *RSC Advances* **2011**, *1* (9), 1737-1744.
69. Qin, S.; Qin, D.; Ford, W. T.; Herrera, J. E.; Resasco, D. E.; Bachilo, S. M.; Weisman, R. B., Solubilization and Purification of Single-Wall Carbon Nanotubes in Water by in Situ Radical Polymerization of Sodium 4-Styrenesulfonate. *Macromolecules* **2004**, *37* (11), 3965-3967.
70. Foroutan, M.; Moshari, M., Effects of hydrophilic unit and its distribution on interfacial binding between single-walled carbon nanotubes, vinyl pyrrolidone and vinyl acetate copolymers. *Physica E: Low-dimensional Systems and Nanostructures* **2011**, *43* (9), 1659-1665.
71. Depan, D.; Shah, J.; Misra, R. D. K., Controlled release of drug from folate-decorated and graphene mediated drug delivery system: Synthesis, loading efficiency, and drug release response. *Materials Science and Engineering: C* **2011**, *31* (7), 1305-1312.
72. Rana, V. K.; Choi, M.-C.; Kong, J.-Y.; Kim, G. Y.; Kim, M. J.; Kim, S.-H.; Mishra, S.; Singh, R. P.; Ha, C.-S., Synthesis and Drug-Delivery Behavior of Chitosan-Functionalized Graphene Oxide Hybrid Nanosheets. *Macromolecular Materials and Engineering* **2011**, *296* (2), 131-140.



73. Bao, H.; Pan, Y.; Ping, Y.; Sahoo, N. G.; Wu, T.; Li, L.; Li, J.; Gan, L. H., Chitosan-functionalized graphene oxide as a nanocarrier for drug and gene delivery. *Small* **2011**, *7* (11), 1569-78.
74. Kakran, M.; Sahoo, N. G.; Bao, H.; Pan, Y.; Li, L., Functionalized graphene oxide as nanocarrier for loading and delivery of ellagic Acid. *Current medicinal chemistry* **2011**, *18* (29), 4503-12.
75. Hu, H.; Yu, J.; Li, Y.; Zhao, J.; Dong, H., Engineering of a novel pluronic F127/graphene nanohybrid for pH responsive drug delivery. *Journal of Biomedical Materials Research Part A* **2012**, *100A* (1), 141-148.
76. Zhang, L.; Xia, J.; Zhao, Q.; Liu, L.; Zhang, Z., Functional Graphene Oxide as a Nanocarrier for Controlled Loading and Targeted Delivery of Mixed Anticancer Drugs. *Small* **2010**, *6* (4), 537-544.
77. Yang, X.; Wang, Y.; Huang, X.; Ma, Y.; Huang, Y.; Yang, R.; Duan, H.; Chen, Y., Multi-functionalized graphene oxide based anticancer drug-carrier with dual-targeting function and pH-sensitivity. *Journal of Materials Chemistry* **2011**, *21* (10), 3448-3454.
78. Pantarotto, D.; Briand, J.-P.; Prato, M.; Bianco, A., Translocation of bioactive peptides across cell membranes by carbon nanotubes. *Chemical Communications* **2004**, (1), 16-17.
79. He, H.; Gao, C., General Approach to Individually Dispersed, Highly Soluble, and Conductive Graphene Nanosheets Functionalized by Nitrene Chemistry. *Chemistry of Materials* **2010**, *22* (17), 5054-5064.
80. Islam, M. F.; Rojas, E.; Bergey, D. M.; Johnson, A. T.; Yodh, A. G., High Weight Fraction Surfactant Solubilization of Single-Wall Carbon Nanotubes in Water. *Nano Letters* **2003**, *3* (2), 269-273.
81. Moore, V. C.; Strano, M. S.; Haroz, E. H.; Hauge, R. H.; Smalley, R. E.; Schmidt, J.; Talmon, Y., Individually Suspended Single-Walled Carbon Nanotubes in Various Surfactants. *Nano Letters* **2003**, *3* (10), 1379-1382.
82. Chen, R. J.; Zhang, Y.; Wang, D.; Dai, H., Noncovalent sidewall functionalization of single-walled carbon nanotubes for protein immobilization. *J Am Chem Soc* **2001**, *123* (16), 3838-9.
83. Star, A.; Stoddart, J. F.; Steuerman, D.; Diehl, M.; Boukai, A.; Wong, E. W.; Yang, X.; Chung, S.-W.; Choi, H.; Heath, J. R., Preparation and Properties of Polymer-Wrapped Single-Walled Carbon Nanotubes. *Angewandte Chemie International Edition* **2001**, *40* (9), 1721-1725.



84. Yang, X.; Zhang, X.; Ma, Y.; Huang, Y.; Wang, Y.; Chen, Y., Superparamagnetic graphene oxide-Fe₃O₄ nanoparticles hybrid for controlled targeted drug carriers. *Journal of Materials Chemistry* **2009**, *19* (18), 2710-2714.
85. Sun, X.; Liu, Z.; Welsher, K.; Robinson, J.; Goodwin, A.; Zaric, S.; Dai, H., Nano-graphene oxide for cellular imaging and drug delivery. *Nano Res.* **2008**, *1* (3), 203-212.
86. Wu, Y.; Phillips, J. A.; Liu, H.; Yang, R.; Tan, W., Carbon nanotubes protect DNA strands during cellular delivery. *ACS Nano* **2008**, *2* (10), 2023-8.
87. Lu, C. H.; Zhu, C. L.; Li, J.; Liu, J. J.; Chen, X.; Yang, H. H., Using graphene to protect DNA from cleavage during cellular delivery. *Chemical communications (Cambridge, England)* **2010**, *46* (18), 3116-8.
88. Wang, Y.; Li, Z.; Hu, D.; Lin, C.-T.; Li, J.; Lin, Y., Aptamer/Graphene Oxide Nanocomplex for in Situ Molecular Probing in Living Cells. *Journal of the American Chemical Society* **2010**, *132* (27), 9274-9276.
89. Fiorito, S.; Serafino, A.; Andreola, F.; Togna, A.; Togna, G., Toxicity and biocompatibility of carbon nanoparticles. *Journal of nanoscience and nanotechnology* **2006**, *6* (3), 591-9.
90. Magrez, A.; Kasas, S.; Salicio, V.; Pasquier, N.; Seo, J. W.; Celio, M.; Catsicas, S.; Schwaller, B.; Forró, L., Cellular Toxicity of Carbon-Based Nanomaterials. *Nano Letters* **2006**, *6* (6), 1121-1125.
91. Simon-Deckers, A.; Gouget, B.; Mayne-L'Hermite, M.; Herlin-Boime, N.; Reynaud, C.; Carrière, M., In vitro investigation of oxide nanoparticle and carbon nanotube toxicity and intracellular accumulation in A549 human pneumocytes. *Toxicology* **2008**, *253* (1-3), 137-146.
92. Ye, S.; Zhang, H.; Wang, Y.; Jiao, F.; Lin, C.; Zhang, Q., Carboxylated single-walled carbon nanotubes induce an inflammatory response in human primary monocytes through oxidative stress and NF- κ B activation. *J Nanopart Res* **2011**, *13* (9), 4239-4252.
93. Lam, C. W.; James, J. T.; McCluskey, R.; Hunter, R. L., Pulmonary toxicity of single-wall carbon nanotubes in mice 7 and 90 days after intratracheal instillation. *Toxicological sciences : an official journal of the Society of Toxicology* **2004**, *77* (1), 126-34.
94. Warheit, D. B.; Laurence, B. R.; Reed, K. L.; Roach, D. H.; Reynolds, G. A.; Webb, T. R., Comparative pulmonary toxicity assessment of single-wall carbon nanotubes in rats. *Toxicological sciences : an official journal of the Society of Toxicology* **2004**, *77* (1), 117-25.



95. Zhang, X.; Yin, J.; Peng, C.; Hu, W.; Zhu, Z.; Li, W.; Fan, C.; Huang, Q., Distribution and biocompatibility studies of graphene oxide in mice after intravenous administration. *Carbon* **2011**, *49* (3), 986-995.
96. Washington, N.; Washington, C.; Wilson, C. G., *Physiological pharmaceuticals: Barriers to drug absorption* Washington, N. ed.; London 2001; p 181.
97. Tang, H.; Murphy, C. J.; Zhang, B.; Shen, Y.; Van Kirk, E. A.; Murdoch, W. J.; Radosz, M., Curcumin polymers as anticancer conjugates. *Biomaterials* **2010**, *31* (27), 7139-7149.
98. Mathew, A.; Fukuda, T.; Nagaoka, Y.; Hasumura, T.; Morimoto, H.; Yoshida, Y.; Maekawa, T.; Venugopal, K.; Kumar, D. S., Curcumin Loaded-PLGA Nanoparticles Conjugated with Tet-1 Peptide for Potential Use in Alzheimer's Disease. *Public Library of Science ONE* **2012**, *7* (3), 32616.
99. Sanoj Rejinold, N.; Muthunayanan, M.; Divyarani, V. V.; Sreerekha, P. R.; Chennazhi, K. P.; Nair, S. V.; Tamura, H.; Jayakumar, R., Curcumin-loaded biocompatible thermoresponsive polymeric nanoparticles for cancer drug delivery. *Journal of Colloid and Interface Science* **2011**, *360* (1), 39-51.
100. Ireson, C. R.; Jones, D. J. L.; Orr, S.; Coughtrie, M. W. H.; Boocock, D. J.; Williams, M. L.; Farmer, P. B.; Steward, W. P.; Gescher, A. J., Metabolism of the Cancer Chemopreventive Agent Curcumin in Human and Rat Intestine. *Cancer Epidemiology Biomarkers & Prevention* **2002**, *11* (1), 105-111.
101. Kunnumakkara, A. B.; Guha, S.; Krishnan, S.; Diagaradjane, P.; Gelovani, J.; Aggarwal, B. B., Curcumin potentiates antitumor activity of gemcitabine in an orthotopic model of pancreatic cancer through suppression of proliferation, angiogenesis, and inhibition of nuclear factor-kappaB-regulated gene products. *Cancer Res* **2007**, *67* (8), 3853-61.
102. Lin, Y. G.; Kunnumakkara, A. B.; Nair, A.; Merritt, W. M.; Han, L. Y.; Armaiz-Pena, G. N.; Kamat, A. A.; Spannuth, W. A.; Gershenson, D. M.; Lutgendorf, S. K.; Aggarwal, B. B.; Sood, A. K., Curcumin inhibits tumor growth and angiogenesis in ovarian carcinoma by targeting the nuclear factor-kappaB pathway. *Clin Cancer Res* **2007**, *13* (11), 3423-30.
103. Masuda, T.; Jitoe, A.; Isobe, J.; Nakatani, N.; Yonemori, S., Anti-oxidative and anti-inflammatory curcumin-related phenolics from rhizomes of *Curcuma domestica*. *Phytochemistry* **1993**, *32* (6), 1557-1560.
104. Sandur, S. K.; Ichikawa, H.; Pandey, M. K.; Kunnumakkara, A. B.; Sung, B.; Sethi, G.; Aggarwal, B. B., Role of pro-oxidants and antioxidants in the anti-inflammatory and



- apoptotic effects of curcumin (diferuloylmethane). *Free radical biology & medicine* **2007**, *43* (4), 568-80.
105. Sandur, S. K.; Pandey, M. K.; Sung, B.; Ahn, K. S.; Murakami, A.; Sethi, G.; Limtrakul, P.; Badmaev, V.; Aggarwal, B. B., Curcumin, demethoxycurcumin, bisdemethoxycurcumin, tetrahydrocurcumin and turmerones differentially regulate anti-inflammatory and anti-proliferative responses through a ROS-independent mechanism. *Carcinogenesis* **2007**, *28* (8), 1765-73.
106. Sharma, O. P., Antioxidant activity of curcumin and related compounds. *Biochemical Pharmacology* **1976**, *25* (15), 1811-1812.
107. Mahady, G. B.; Pendland, S. L.; Yun, G.; Lu, Z. Z., Turmeric (*Curcuma longa*) and curcumin inhibit the growth of *Helicobacter pylori*, a group 1 carcinogen. *Anticancer Res* **2002**, *22* (6c), 4179-81.
108. Kuttan, R.; Bhanumathy, P.; Nirmala, K.; George, M. C., Potential anticancer activity of turmeric (*Curcuma longa*). *Cancer Lett* **1985**, *29* (2), 197-202.
109. Jordan, W. C.; Drew, C. R., Curcumin--a natural herb with anti-HIV activity. *Journal of the National Medical Association* **1996**, *88* (6), 333.
110. Gandhi, P.; Khan, Z.; Chakraverty, N., Soluble Curcumin: A Promising Oral Supplement For Health Management. *Journal of Applied Pharmaceutical Science 01* **2011**, *1* (2), 1-7.
111. Anand, P.; Kunnumakkara, A. B.; Newman, R. A.; Aggarwal, B. B., Bioavailability of Curcumin: Problems and Promises. *Molecular Pharmaceutics* **2007**, *4* (6), 807-818.
112. Kamat, A. M.; Sethi, G.; Aggarwal, B. B., Curcumin potentiates the apoptotic effects of chemotherapeutic agents and cytokines through down-regulation of nuclear factor-kappaB and nuclear factor-kappaB-regulated gene products in IFN-alpha-sensitive and IFN-alpha-resistant human bladder cancer cells. *Mol Cancer Ther* **2007**, *6* (3), 1022-30.
113. Sharma, C.; Kaur, J.; Shishodia, S.; Aggarwal, B. B.; Ralhan, R., Curcumin down regulates smokeless tobacco-induced NF-kappaB activation and COX-2 expression in human oral premalignant and cancer cells. *Toxicology* **2006**, *228* (1), 1-15.
114. Murakami, Y.; Shoji, M.; Hirata, A.; Tanaka, S.; Hanazawa, S.; Yokoe, I.; Fujisawa, S., An ortho dimer of butylated hydroxyanisole inhibits nuclear factor kappa B activation and gene expression of inflammatory cytokines in macrophages stimulated by *Porphyromonas gingivalis fimbriae*. *Archives of Biochemistry and Biophysics* **2006**, *449* (1-2), 171-177.
115. Murakami, Y.; Shoji, M.; Ogiwara, T.; Tanaka, S.; Yokoe, I.; Fujisawa, S., Preventive Effect of Ortho Dimer of Butylated Hydroxyanisole on Activator Protein-1



- Activation and Cyclooxygenase-2 Expression in Macrophages Stimulated by Fimbriae of *Porphyromonas gingivalis*, an Oral Anaerobe. *Anticancer Research* **2006**, *26* (4B), 2915-2920.
116. Aggarwal, S.; Ichikawa, H.; Takada, Y.; Sandur, S. K.; Shishodia, S.; Aggarwal, B. B., Curcumin (diferuloylmethane) down-regulates expression of cell proliferation and antiapoptotic and metastatic gene products through suppression of IκB kinase and Akt activation. *Mol Pharmacol* **2006**, *69* (1), 195-206.
117. Wahlström, B.; Blennow, G., A Study on the Fate of Curcumin in the Rat. *Acta Pharmacologica et Toxicologica* **1978**, *43* (2), 86-92.
118. Ravindranath, V.; Chandrasekhara, N., In vitro studies on the intestinal absorption of curcumin in rats. *Toxicology* **1981**, *20* (2-3), 251-257.
119. Ravindranath, V.; Chandrasekhara, N., Absorption and tissue distribution of curcumin in rats. *Toxicology* **1980**, *16* (3), 259-265.
120. Ravindranath, V.; Chandrasekhara, N., Metabolism of curcumin-studies with [3H]curcumin. *Toxicology* **1981**, *22* (4), 337-344.
121. Chearwae, W.; Wu, C.-P.; Chu, H. Y.; Lee, T. R.; Ambudkar, S.; Limtrakul, P., Curcuminoids purified from turmeric powder modulate the function of human multidrug resistance protein 1 (ABCC1). *Cancer Chemother Pharmacol* **2006**, *57* (3), 376-388.
122. Bisht, S.; Feldmann, G.; Soni, S.; Ravi, R.; Karikar, C.; Maitra, A.; Maitra, A., Polymeric nanoparticle-encapsulated curcumin ("nanocurcumin"): a novel strategy for human cancer therapy. *Journal of Nanobiotechnology* **2007**, *5* (1), 3.
123. Sahu, A.; Bora, U.; Kasoju, N.; Goswami, P., Synthesis of novel biodegradable and self-assembling methoxy poly(ethylene glycol)-palmitate nanocarrier for curcumin delivery to cancer cells. *Acta Biomaterialia* **2008**, *4* (6), 1752-1761.
124. Anand, P.; Nair, H. B.; Sung, B.; Kunnumakkara, A. B.; Yadav, V. R.; Tekmal, R. R.; Aggarwal, B. B., Design of curcumin-loaded PLGA nanoparticles formulation with enhanced cellular uptake, and increased bioactivity in vitro and superior bioavailability in vivo. *Biochemical Pharmacology* **2010**, *79* (3), 330-338.
125. Das, R. K.; Kasoju, N.; Bora, U., Encapsulation of curcumin in alginate-chitosan-pluronic composite nanoparticles for delivery to cancer cells. *Nanomedicine: Nanotechnology, Biology and Medicine* **2010**, *6* (1), 153-160.
126. Bansal, S. S.; Kausar, H.; Vadhanam, M. V.; Ravoori, S.; Gupta, R. C., Controlled systemic delivery by polymeric implants enhances tissue and plasma curcumin levels compared with oral administration. *European Journal of Pharmaceutics and Biopharmaceutics* **2012**, *80* (3), 571-577.



127. Parvathy, K. S.; Negi, P. S.; Srinivas, P., Curcumin–amino acid conjugates: Synthesis, antioxidant and antimutagenic attributes. *Food Chemistry* **2010**, *120* (2), 523-530.
128. Amornwachirabodee, K.; Chiablaem, K.; Wacharasindhu, S.; Lirdprapamongkol, K.; Svasti, J.; Vchirawongkwin, V.; Wanichwecharungruang, S. P., Paclitaxel delivery using carrier made from curcumin derivative: Synergism between carrier and the loaded drug for effective cancer treatment. *Journal of Pharmaceutical Sciences* **2012**, *101* (10), 3779-3786.
129. Vernille, J. P.; Kovell, L. C.; Schneider, J. W., Peptide Nucleic Acid (PNA) Amphiphiles: Synthesis, Self-Assembly, and Duplex Stability. *Bioconjugate Chemistry* **2004**, *15* (6), 1314-1321.
130. Egholm, M.; Christensen, L.; Deulholm, K. L.; Buchardt, O.; Coull, J.; Nielsen, P. E., Efficient pH-independent sequence-specific DNA binding by pseudoisocytosine-containing bis-PNA. *Nucleic Acids Research* **1995**, *23* (2), 217-222.
131. Griffith, M. C.; Risen, L. M.; Greig, M. J.; Lesnik, E. A.; Sprankle, K. G.; Griffey, R. H.; Kiely, J. S.; Freier, S. M., Single and Bis Peptide Nucleic Acids as Triplexing Agents: Binding and Stoichiometry. *Journal of the American Chemical Society* **1995**, *117* (2), 831-832.
132. Betts, L.; Josey, J. A.; Veal, J. M.; Jordan, S. R., A nucleic acid triple helix formed by a peptide nucleic acid-DNA complex. *Science* **1995**, *270* (5243), 1838-41.
133. Demidov, V. V.; Yavnilovich, M. V.; Frank-Kamenetskii, M. D., Kinetic analysis of specificity of duplex DNA targeting by homopyrimidine peptide nucleic acids. *Biophysical Journal* **1997**, *72* (6), 2763-2769.
134. Demidov, V.; Frank-Kamenetskii, M. D.; Egholm, M.; Buchard, O.; Nielsen, P. E., Sequence selective double strand DNA cleavage by peptide nucleic acid (PNA) targeting using nuclease S1. *Nucleic acid research* **1993**, *21*, 2103-2107.
135. Demidov, V. V.; Potaman, V. N.; Frank-Kamenetskii, M. D.; Egholm, M.; Buchard, O.; Sönnichsen, S. H.; Nielsen, P. E., Stability of peptide nucleic acids in human serum and cellular extracts. *Biochemical Pharmacology* **1994**, *48* (6), 1310-1313.
136. Egholm, M.; Buchardt, O.; Christensen, L.; Behrens, C.; Freier, S. M.; Driver, D. A.; Berg, R. H.; Kim, S. K.; Norden, B.; Nielsen, P. E., PNA hybridizes to complementary oligonucleotides obeying the Watson-Crick hydrogen-bonding rules. *Nature* **1993**, *365* (6446), 566-8.
137. Vilaivan, T.; Srisuwannaket, C., Hybridization of Pyrrolidinyl Peptide Nucleic Acids and DNA: Selectivity, Base-Pairing Specificity, and Direction of Binding. *Organic Letters* **2006**, *8* (9), 1897-1900.



138. Vilaivan, T.; Lowe, G., A Novel Pyrrolidinyl PNA Showing High Sequence Specificity and Preferential Binding to DNA over RNA. *Journal of the American Chemical Society* **2002**, *124* (32), 9326-9327.
139. Nielsen, P. E., Peptide nucleic acids as therapeutic agents. *Current Opinion in Structural Biology* **1999**, *9* (3), 353-357.
140. Buchardt, O.; Egholm, M.; Berg, R. H.; Nielsen, P. E., Peptide nucleic acids and their potential applications in biotechnology. *Trends in biotechnology* **1993**, *11* (9), 384-6.
141. Lowe, G.; Vilaivan, T., Amino acids bearing nucleobases for the synthesis of novel peptide nucleic acids. *Journal of the Chemical Society, Perkin Transactions 1* **1997**, (4), 539-546.
142. Lowe, G.; Vilaivan, T., Dipeptides bearing nucleobases for the synthesis of novel peptide nucleic acids. *Journal of the Chemical Society, Perkin Transactions 1* **1997**, (4), 547-554.
143. Vilaivan, T.; Suparpprom, C.; Harnyuttanakorn, P.; Lowe, G., Synthesis and properties of novel pyrrolidinyl PNA carrying β -amino acid spacers. *Tetrahedron Letters* **2001**, *42* (32), 5533-5536.
144. Suparpprom, C.; Srisuwannaket, C.; Sangvanich, P.; Vilaivan, T., Synthesis and oligodeoxynucleotide binding properties of pyrrolidinyl peptide nucleic acids bearing prolyl-2-aminocyclopentanecarboxylic acid (ACPC) backbones. *Tetrahedron Letters* **2005**, *46* (16), 2833-2837.
145. Siriwong, K.; Chuichay, P.; Saen-oon, S.; Suparpprom, C.; Vilaivan, T.; Hannongbua, S., Insight into why pyrrolidinyl peptide nucleic acid binding to DNA is more stable than the DNA-DNA duplex. *Biochemical and Biophysical Research Communications* **2008**, *372* (4), 765-771.
146. Uhlmann, E.; Peyman, A., Antisense oligonucleotides: a new therapeutic principle. *Chemical Reviews* **1990**, *90* (4), 543-584.
147. Nielsen, P. E.; Egholm, M.; Berg, R. H.; Buchardt, O., Peptide nucleic acids (PNAs): potential antisense and anti-gene agents. *Anti-cancer drug design* **1993**, *8* (1), 53-63.
148. Vickers, i. A.; Griffith, M. C.; Ramasamy, K.; Risen, L. M.; Freier, S. M., Inhibition of NF- κ B specific transcriptional activation by PNA strand invasion. *Nucleic Acids Research* **1995**, *23* (15), 3003-3008.
149. Giovanna, C.; Elisabetta, M. C.; Massimo, U.; Silvio, R.; Olfert, L.; Manlio, F.; Lidia, C. B., Effects in live cells of a c-myc anti-gene PNA linked to a nuclear localization signal. *Nature Biotechnology* **2000**, *18* (3), 300-303.



137614976

150. Tonelli, R.; Purgato, S.; Camerin, C.; Fronza, R.; Bologna, F.; Alboresi, S.; Franzoni, M.; Corradini, R.; Sforza, S.; Faccini, A.; Shohet, J. M.; Marchelli, R.; Pession, A., Anti-gene peptide nucleic acid specifically inhibits MYCN expression in human neuroblastoma cells leading to cell growth inhibition and apoptosis. *Molecular Cancer Therapeutics* **2005**, *4* (5), 779-786.
151. Hyrup, B.; Nielsen, P. E., Peptide Nucleic Acids (PNA): Synthesis, properties and potential applications. *Bioorganic & medicinal chemistry* **1996**, *4* (1), 5-23.
152. Eriksson, M.; Nielsen, P. E., PNA-nucleic acid complexes. Structure, stability and dynamics. *Quarterly Reviews of Biophysics* **1996**, *29* (04), 369-394.
153. Good, L.; Nielsen, P. E., Progress in developing PNA as a gene-targeted drug. *Antisense & nucleic acid drug development* **1997**, *7* (4), 431-7.
154. Ljungström, T.; Knudsen, H.; Nielsen, P. E., Cellular Uptake of Adamantyl Conjugated Peptide Nucleic Acids. *Bioconjugate Chemistry* **1999**, *10* (6), 965-972.
155. Gagnon, K. T.; Watts, J. K.; Pendergraff, H. M.; Montailier, C.; Thai, D.; Potier, P.; Corey, D. R., Antisense and Antigene Inhibition of Gene Expression by Cell-Permeable Oligonucleotide–Oligospermine Conjugates. *Journal of the American Chemical Society* **2011**, *133* (22), 8404-8407.
156. Macadangdang, B.; Zhang, N.; Lund, P. E.; Marple, A. H.; Okabe, M.; Gottesman, M. M.; Appella, D. H.; Kimchi-Sarfaty, C., Inhibition of multidrug resistance by SV40 pseudovirion delivery of an antigene peptide nucleic acid (PNA) in cultured cells. *PLoS one* **2011**, *6* (3), e17981.
157. Hirano, T.; Taga, T.; Nakano, N.; Yasukawa, K.; Kashiwamura, S.; Shimizu, K.; Nakajima, K.; Pyun, K. H.; Kishimoto, T., Purification to homogeneity and characterization of human B-cell differentiation factor (BCDF or BSFp-2). *Proceedings of the National Academy of Sciences* **1985**, *82* (16), 5490-5494.
158. Horii, Y.; Muraguchi, A.; Suematsu, S.; Matsuda, T.; Yoshizaki, K.; Hirano, T.; Kishimoto, T., Regulation of BSF-2/IL-6 production by human mononuclear cells. Macrophage-dependent synthesis of BSF-2/IL-6 by T cells. *J Immunol* **1988**, *141* (5), 1529-35.
159. Freeman, G. J.; Freedman, A. S.; Rabinowe, S. N.; Segil, J. M.; Horowitz, J.; Rosen, K.; Whitman, J. F.; Nadler, L. M., Interleukin 6 gene expression in normal and neoplastic B cells. *The Journal of Clinical Investigation* **1989**, *83* (5), 1512-1518.
160. Kawano, M.; Hirano, T.; Matsuda, T.; Taga, T.; Horii, Y.; Iwato, K.; Asaoku, H.; Tang, B.; Tanabe, O.; Tanaka, H.; et al., Autocrine generation and requirement of BSF-2/IL-6 for human multiple myelomas. *Nature* **1988**, *332* (6159), 83-5.



161. Gabay, C., Interleukin-6 and chronic inflammation. *Arthritis research & therapy* **2006**, *8 Suppl 2*, S3.
162. Gauldie, J.; Richards, C.; Harnish, D.; Lansdorp, P.; Baumann, H., Interferon beta 2/B-cell stimulatory factor type 2 shares identity with monocyte-derived hepatocyte-stimulating factor and regulates the major acute phase protein response in liver cells. *Proceedings of the National Academy of Sciences* **1987**, *84* (20), 7251-7255.
163. Bauer, J.; Ganter, U.; Geiger, T.; Jacobshagen, U.; Hirano, T.; Matsuda, T.; Kishimoto, T.; Andus, T.; Acs, G.; Gerok, W., Regulation of interleukin-6 expression in cultured human blood monocytes and monocyte-derived macrophages. *Blood* **1988**, *72* (4), 1134-1140.
164. Jirik, F. R.; Podor, T. J.; Hirano, T.; Kishimoto, T.; Loskutoff, D. J.; Carson, D. A.; Lotz, M., Bacterial lipopolysaccharide and inflammatory mediators augment IL-6 secretion by human endothelial cells. *The Journal of Immunology* **1989**, *142* (1), 144-7.
165. Sironi, M.; Breviario, F.; Proserpio, P.; Biondi, A.; Vecchi, A.; Van Damme, J.; Dejana, E.; Mantovani, A., IL-1 stimulates IL-6 production in endothelial cells. *The Journal of Immunology* **1989**, *142* (2), 549-53.
166. Ritchie, D. G.; Fuller, G. M., HEPATOCYTE-STIMULATING FACTOR: A MONOCYTE-DERIVED ACUTE-PHASE REGULATORY PROTEIN. *Annals of the New York Academy of Sciences* **1983**, *408* (1), 490-502.
167. Kishimoto, T.; Hirano, T., Molecular Regulation of B Lymphocyte Response. *Annual Review of Immunology* **1988**, *6* (1), 485-512.
168. Wong, G. G.; Clark, S. C., Multiple actions of interleukin 6 within a cytokine network. *Immunology Today* **1988**, *9* (5), 137-139.
169. Helfgott, D. C.; May, L. T.; Sthoeger, Z.; Tamm, I.; Sehgal, P. B., Bacterial lipopolysaccharide (endotoxin) enhances expression and secretion of beta 2 interferon by human fibroblasts. *The Journal of experimental medicine* **1987**, *166* (5), 1300-9.
170. Zhang, Y. H.; Lin, J. X.; Yip, Y. K.; Vilcek, J., Enhancement of cAMP levels and of protein kinase activity by tumor necrosis factor and interleukin 1 in human fibroblasts: role in the induction of interleukin 6. *Proceedings of the National Academy of Sciences* **1988**, *85* (18), 6802-6805.
171. Kohase, M.; May, L. T.; Tamm, I.; Vilcek, J.; Sehgal, P. B., A cytokine network in human diploid fibroblasts: interactions of beta-interferons, tumor necrosis factor, platelet-derived growth factor, and interleukin-1. *Molecular and cellular biology* **1987**, *7* (1), 273-80.



172. Ananthanawat, C.; Vilaivan, T.; Hoven, V. P.; Su, X., Comparison of DNA, aminoethylglycyl PNA and pyrrolidiny PNA as probes for detection of DNA hybridization using surface plasmon resonance technique. *Biosensors and Bioelectronics* **2010**, *25* (5), 1064-1069.
173. Libermann, T. A.; Baltimore, D., Activation of interleukin-6 gene expression through the NF-kappa B transcription factor. *Molecular and cellular biology* **1990**, *10* (5), 2327-34.
174. Ray, A.; Tatter, S. B.; May, L. T.; Sehgal, P. B., Activation of the human "beta 2-interferon/hepatocyte-stimulating factor/interleukin 6" promoter by cytokines, viruses, and second messenger agonists. *Proceedings of the National Academy of Sciences* **1988**, *85* (18), 6701-6705.
175. Matsusaka, T.; Fujikawa, K.; Nishio, Y.; Mukaida, N.; Matsushima, K.; Kishimoto, T.; Akira, S., Transcription factors NF-IL6 and NF-kappa B synergistically activate transcription of the inflammatory cytokines, interleukin 6 and interleukin 8. *Proceedings of the National Academy of Sciences* **1993**, *90* (21), 10193-10197.
176. Betts, J. C.; Cheshire, J. K.; Akira, S.; Kishimoto, T.; Woo, P., The role of NF-kappa B and NF-IL6 transactivating factors in the synergistic activation of human serum amyloid A gene expression by interleukin-1 and interleukin-6. *Journal of Biological Chemistry* **1993**, *268* (34), 25624-31.
177. Zampetaki, A.; Zhang, Z.; Hu, Y.; Xu, Q., Biomechanical stress induces IL-6 expression in smooth muscle cells via Ras/Rac1-p38 MAPK-NF- κ B signaling pathways. *American Journal of Physiology - Heart and Circulatory Physiology* **2005**, *288* (6), H2946-H2954.
178. Ropelle, E. R.; Flores, M. B.; Cintra, D. E.; Rocha, G. Z.; Pauli, J. R.; Morari, J.; de Souza, C. T.; Moraes, J. C.; Prada, P. O.; Guadagnini, D.; Marin, R. M.; Oliveira, A. G.; Augusto, T. M.; Carvalho, H. F.; Velloso, L. A.; Saad, M. J. A.; Carvalheira, J. B. C., IL-6 and IL-10 Anti-Inflammatory Activity Links Exercise to Hypothalamic Insulin and Leptin Sensitivity through IKK β and ER Stress Inhibition. *PLoS Biol* **2010**, *8* (8), 1000465.
179. Tseng, W.; Lu, J.; Bishop, G. A.; Watson, A. D.; Sage, A. P.; Demer, L.; Tintut, Y., Regulation of interleukin-6 expression in osteoblasts by oxidized phospholipids. *Journal of Lipid Research* **2010**, *51* (5), 1010-1016.
180. Drygin, D.; Ho, C. B.; Omori, M.; Bliesath, J.; Proffitt, C.; Rice, R.; Siddiqui-Jain, A.; O'Brien, S.; Padgett, C.; Lim, J. K. C.; Anderes, K.; Rice, W. G.; Ryckman, D., Protein kinase CK2 modulates IL-6 expression in inflammatory breast cancer. *Biochemical and Biophysical Research Communications* **2011**, *415* (1), 163-167.



181. Grigoriev, M.; Praseuth, D.; Robin, P.; Hemar, A.; Saison-Behmoaras, T.; Dautry-Varsat, A.; Thuong, N. T.; Helene, C.; Harel-Bellan, A., A triple helix-forming oligonucleotide-intercalator conjugate acts as a transcriptional repressor via inhibition of NF kappa B binding to interleukin-2 receptor alpha-regulatory sequence. *J Biol Chem* **1992**, *267* (5), 3389-95.
182. Livak, K. J.; Schmittgen, T. D., Analysis of relative gene expression data using real-time quantitative PCR and the 2- $\Delta\Delta$ CT Method. *Methods* **2001**, *25*, 402-408.
183. Myhra, S.; Riviere, J. C., Characterization of nanostructures; Chapter 6.4: zeta potential. *Taylor and Francis group* **2012**, 151-152.
184. Wilson, N. R.; Pandey, P. A.; Beanland, R.; Young, R. J.; Kinloch, I. A.; Gong, L.; Liu, Z.; Suenaga, K.; Rourke, J. P.; York, S. J.; Sloan, J., Graphene Oxide: Structural Analysis and Application as a Highly Transparent Support for Electron Microscopy. *ACS Nano* **2009**, *3* (9), 2547-2556.
185. Kudin, K. N.; Ozbas, B.; Schniepp, H. C.; Prud'homme, R. K.; Aksay, I. A.; Car, R., Raman spectra of graphite oxide and functionalized graphene sheets. *Nano Lett* **2008**, *8* (1), 36-41.
186. McMahon, H. T.; Boucrot, E., Molecular mechanism and physiological functions of clathrin-mediated endocytosis. *Nature reviews. Molecular cell biology* **2011**, *12* (8), 517-33.
187. Stephan, H.; Foerster, C.; Gasser, G., Synthesis, Characterization, and Evaluation of Radiometal-Containing Peptide Nucleic Acids. In *Peptide Nucleic Acids*, Nielsen, P. E.; Appella, D. H., Eds. Humana Press: 2014; Vol. 1050, pp 37-54.
188. Yano, T.; Nakamura, T.; Blechman, J.; Sorio, C.; Dang, C. V.; Geiger, B.; Canaani, E., Nuclear punctate distribution of ALL-1 is conferred by distinct elements at the N terminus of the protein. *Proceedings of the National Academy of Sciences of the United States of America* **1997**, *94* (14), 7286-91.
189. Álvarez, M.; Estivill, X.; de la Luna, S., DYRK1A accumulates in splicing speckles through a novel targeting signal and induces speckle disassembly. *Journal of Cell Science* **2003**, *116* (15), 3099-3107.
190. Reddy, A. S. N.; Day, I. S.; Göhring, J.; Barta, A., Localization and Dynamics of Nuclear Speckles in Plants. *Plant Physiology* **2012**, *158* (1), 67-77.
191. Virakul, S.; Laopa, P. S.; Vilaivan, T.; Hirankarn, N., personal discussion: monitoring interaction of acpcPNA with DNA duplexes by gel electrophoresis. **2013**.



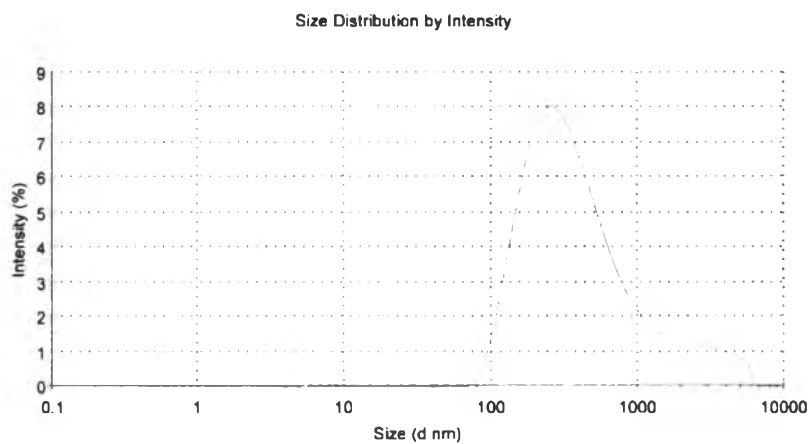
APPENDIECS



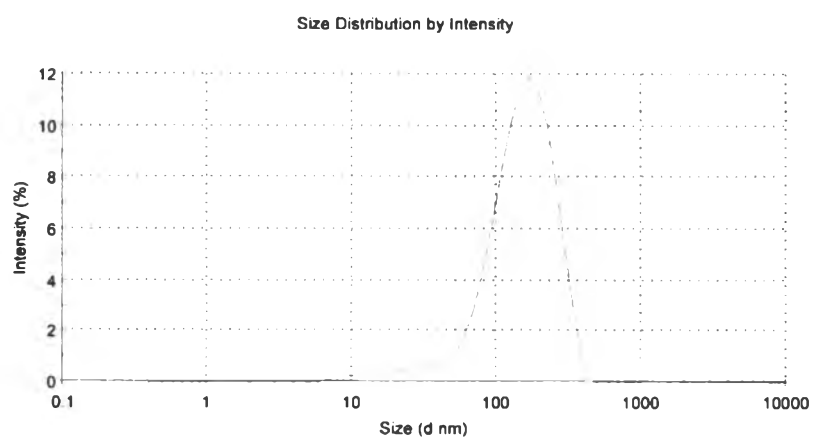


APPENDIX A

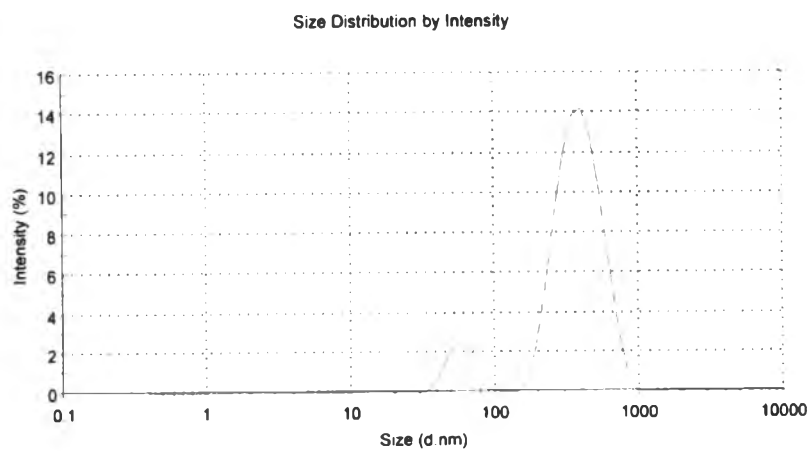
Dynamic light scattering (DLS)



(a)

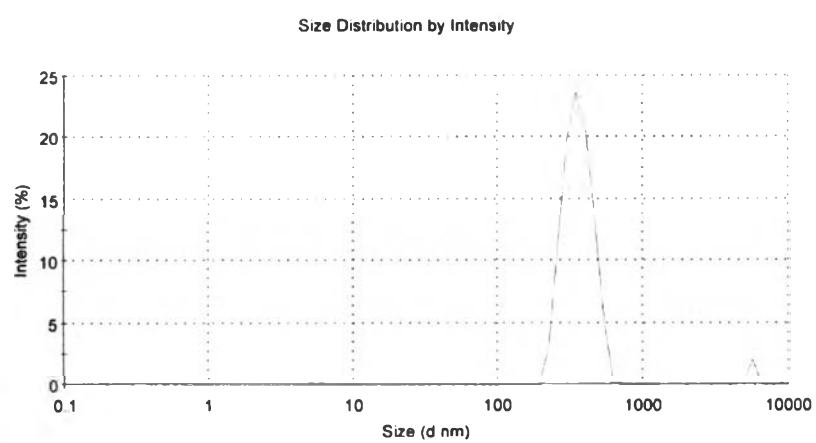


(b)



(c)

Figure A 1 Size distribution of GOSHs (a), CCNs (b), CCNsT (c) and CCNsT-C (d)

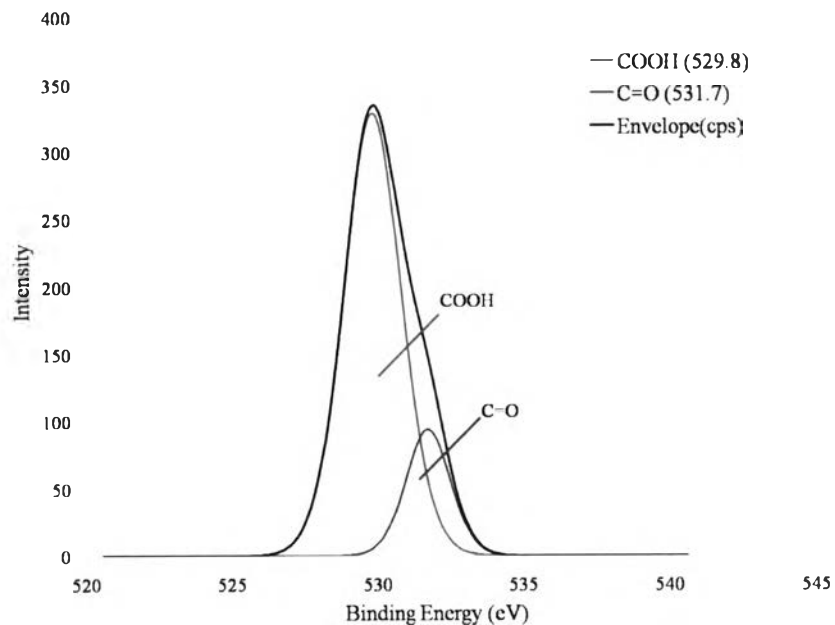


(d)

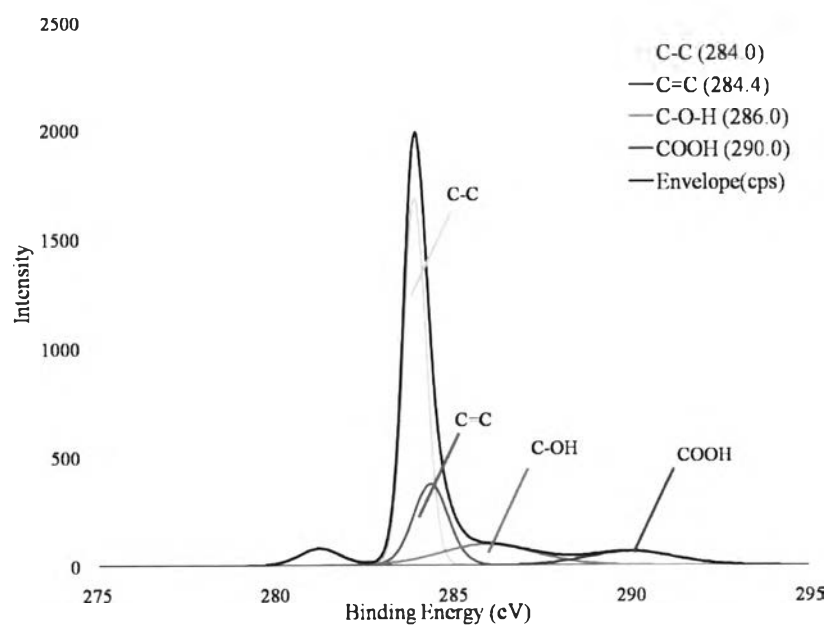
Figure A 1 Size distribution of GOShs (a), CCNs (b), CCNsT (c) and CCNsT-C (d)
(continued)



X-ray photoelectron spectroscopy (XPS)



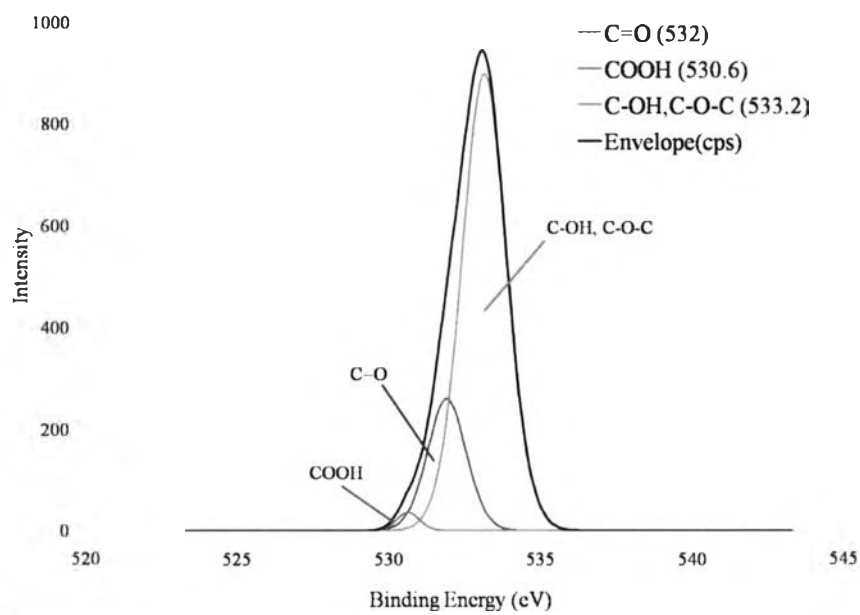
a)



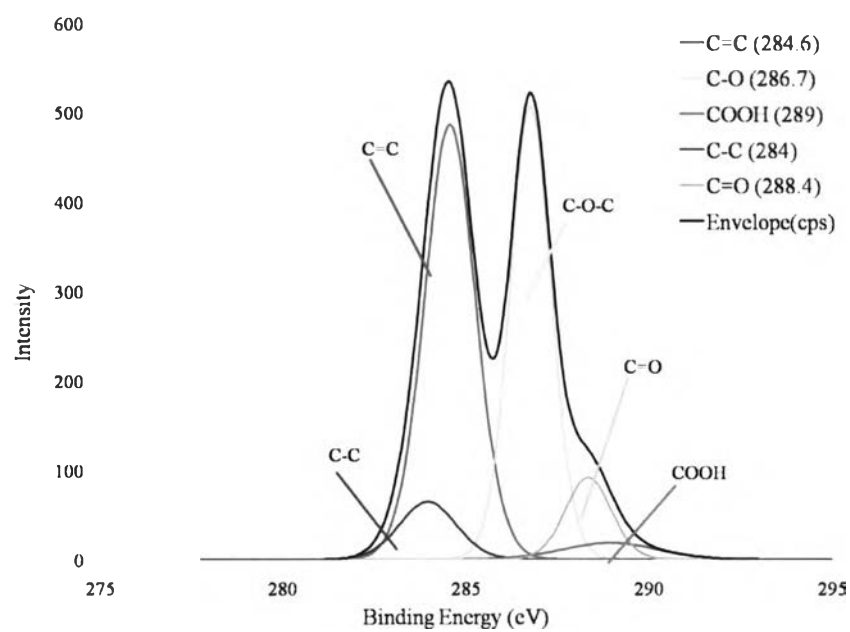
b)

Figure A 2 The XPS spectra of the graphite (a,b), GOShs (c,d) and CCNs (e,f) derived deconvoluted O1s (a,c,e) and C1s (b,d,f)





c)



d)

Figure A 2 The XPS spectra of the graphite (a,b), GOShs (c,d) and CCNs (e,f) derived deconvoluted O1s (a,c,e) and C1s (b,d,f) (continued)



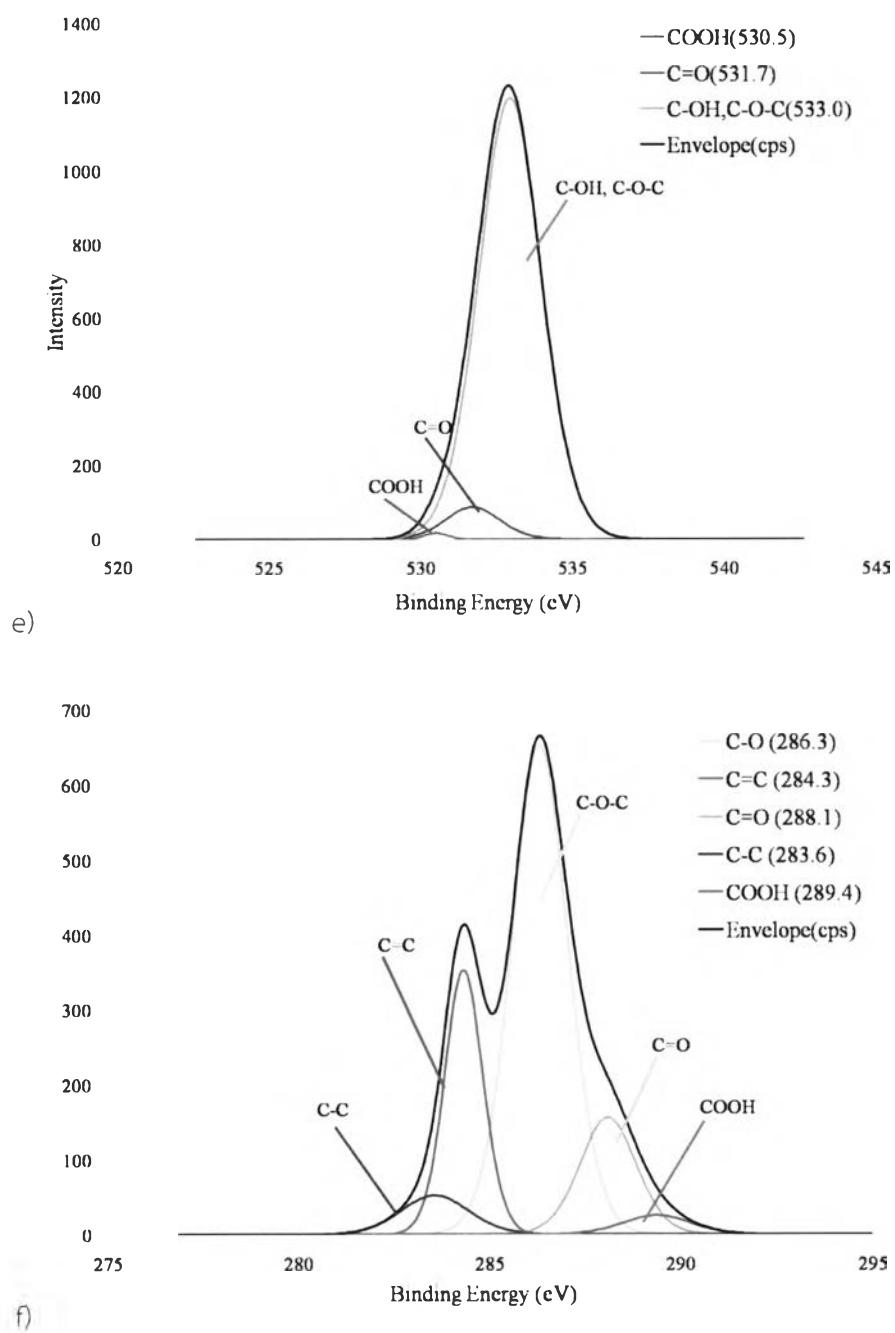
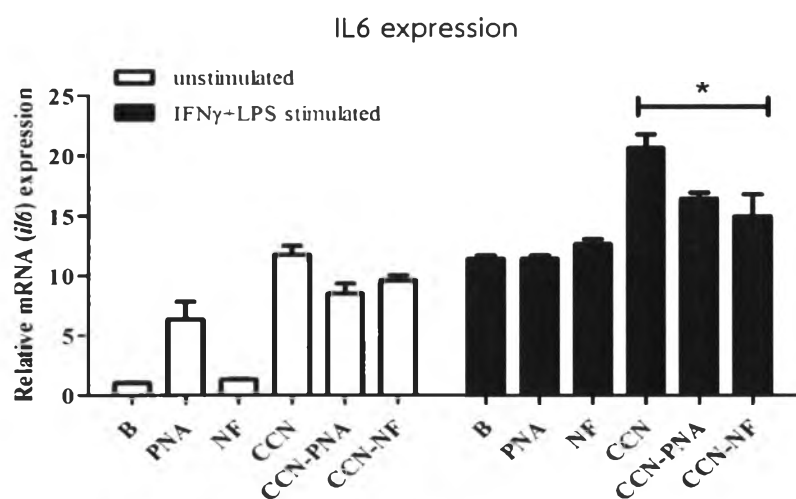


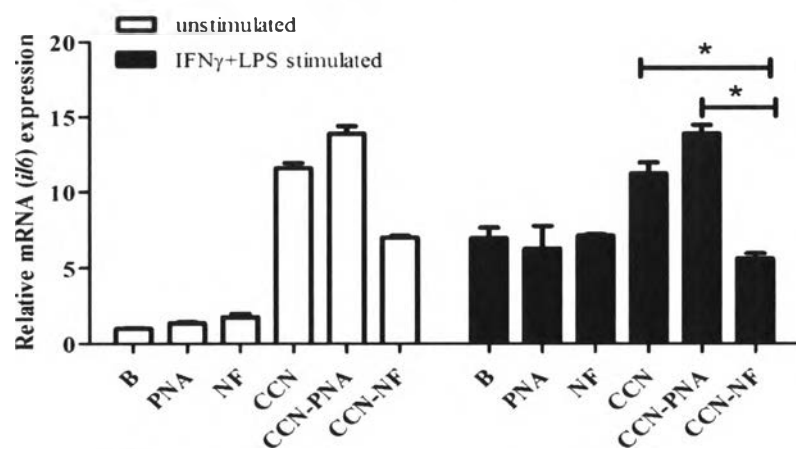
Figure A 2 The XPS spectra of the graphite (a,b), GOShs (c,d) and CCNs (e,f) derived deconvoluted O1s (a,c,e) and C1s (b,d,f) (continued)



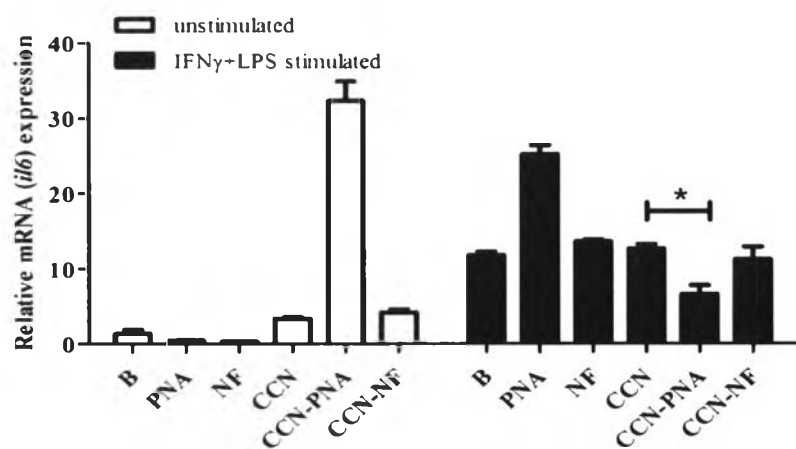
APPENDIX B



a)



b)



c)

* indicated the statistically significant differences between conditions at $p < 0.05$

Figure B 1 Levels of IL6 mRNA in LPS plus IFN γ -stimulated RAW 264.7 cells at 4 h (a-c) of incubations



137614976

VITA

Miss Sunatda Arayachukiat was born on July 22, 1986 in Bangkok. She received a Bachelor's Degree of Science in Medical Technology from Chulalongkorn University in 2007. After that, she received a Master degree in the Program of Petrochemistry and Polymer Science, Faculty of Science, Chulalongkorn University. She has started Doctoral degree in the Program Macromolecular science, Faculty of Science, Chulalongkorn University under the supervision of Associate Professor Supason Wanichwecharungruang. After that, she has started Dual Doctoral degree between Chulalongkorn University and Japan Advance Institute Science and Technology (JAIST) in 2012. She has started Doctoral degree in school of Materials science, JAIST under the supervision of Professor Masayuki Yamaguchi. During her study, she presented her research works at 62nd SPSJ Annual meeting, Kyoto, Japan.

Her address is 211, Soi Prachau-tid 41, Prachau-tid Road, Bangmod, Tungkru, Bangkok, 10140, Tel. 083-9214461.

Academic Publications

1. Arayachukeat, S., Palaga, T, and Wanichwecharungruang, S. Clusters of Carbon Nanospheres Derived from Graphene Oxide. ACS Applied Materials and Interfaces. Accepted.

