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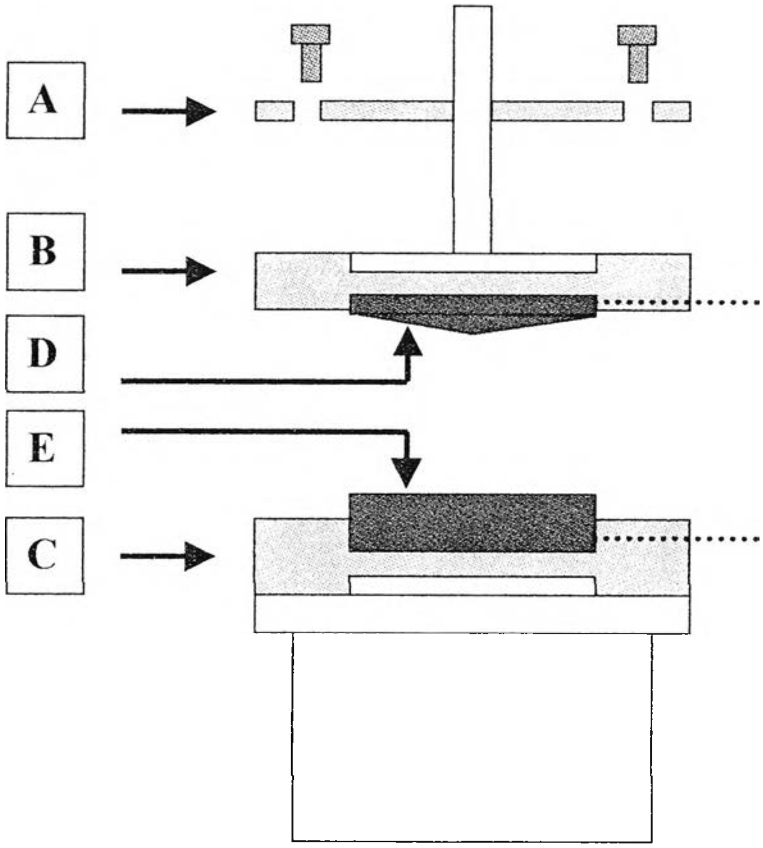
APPENDICES

APPENDIX A Schematic Diagram of Cone and Plate Geometry



PART A

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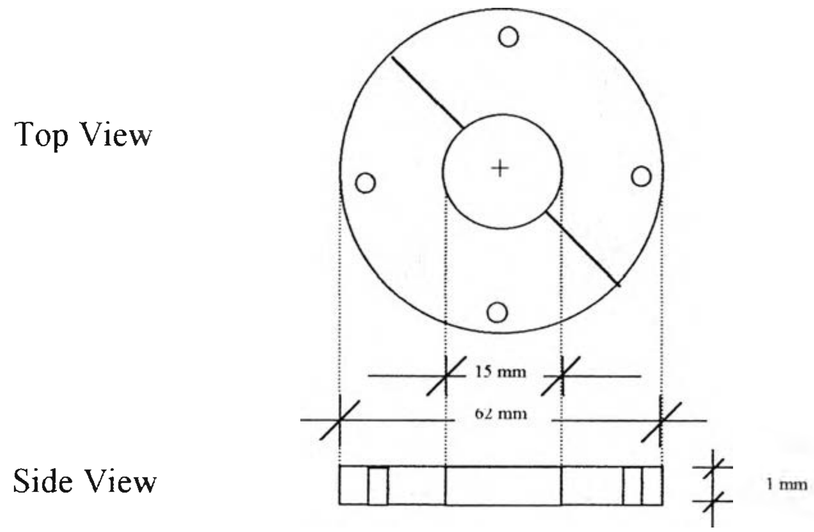

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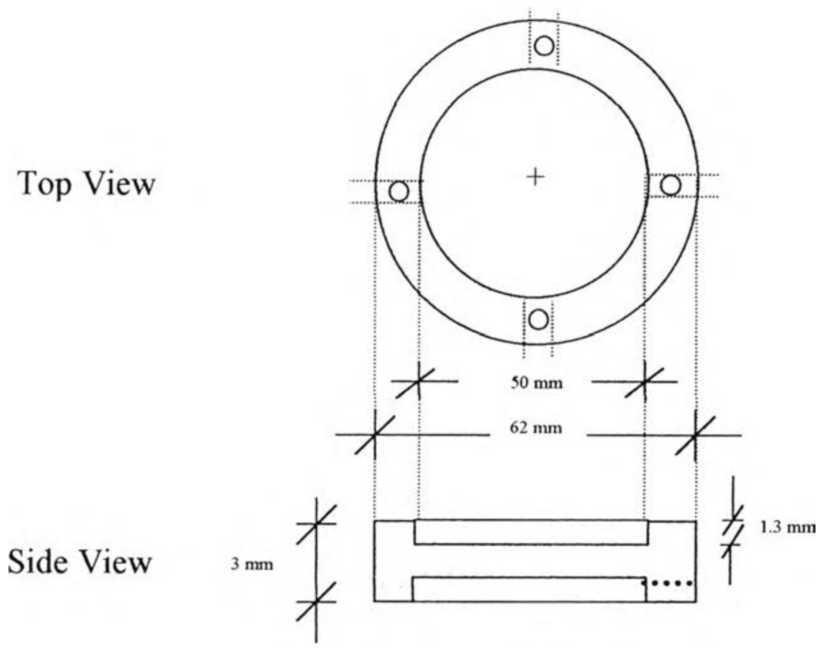

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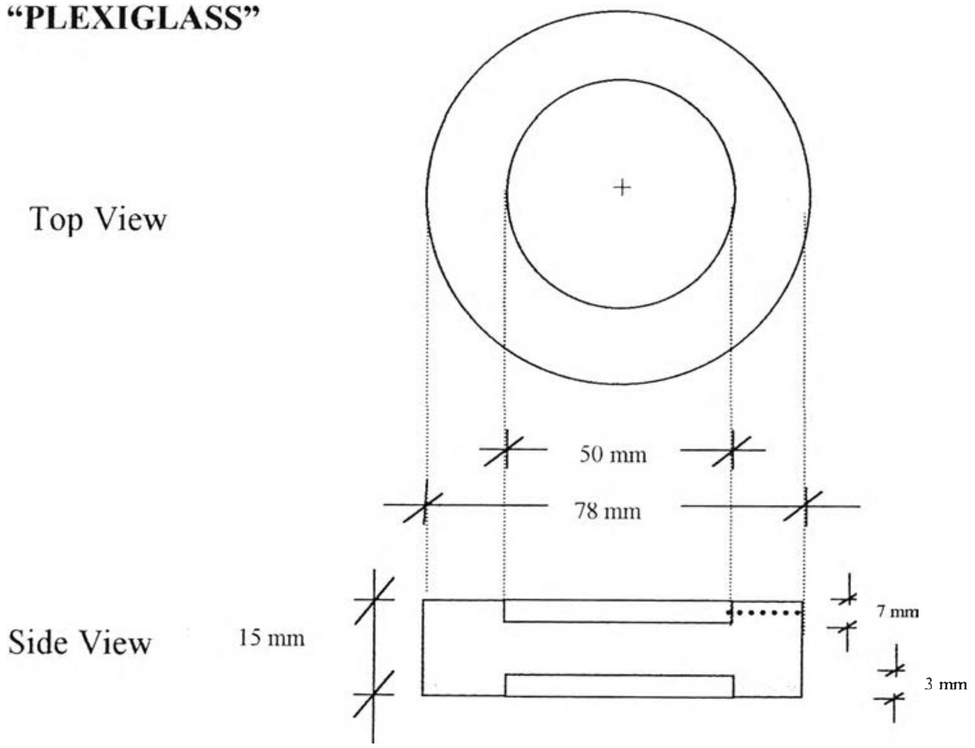

PART D

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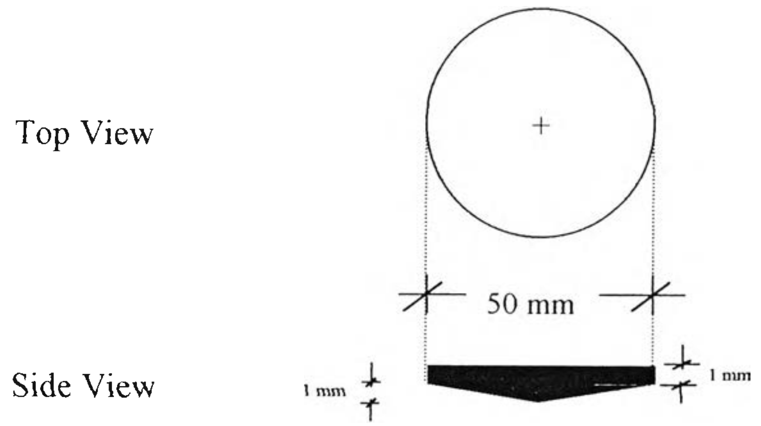
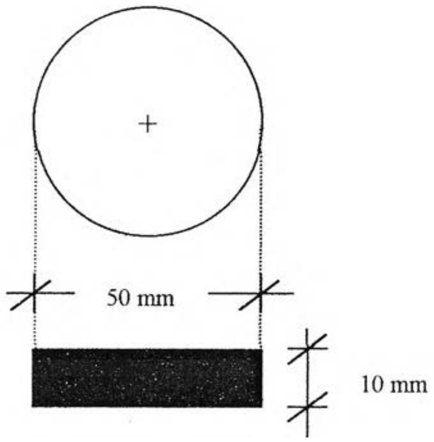


PART E

“COPPER”

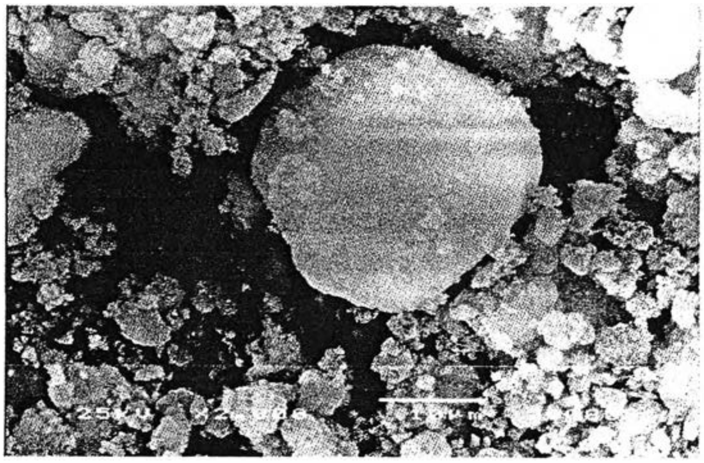
Top View

Side View

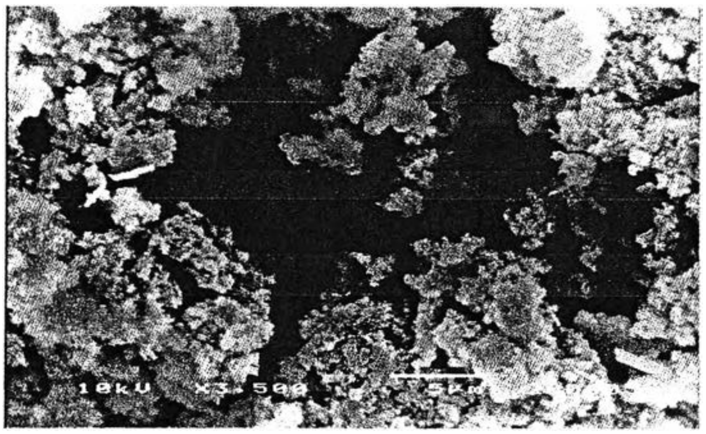


APPENDIX B SEM Micrographs of Silica(S5631), Silica (H927), and Polyaniline Particles.

a) Silica (S5631)



b) Silica (H927)



c) PAN

Figure B-1 SEM micrograpghs of a) Silica (S5631); b) Silica (H927); and c) PAN particles.

APPENDIX C TGA Thermograms of Silica (S5631), Silica (H927), and PAN Particles

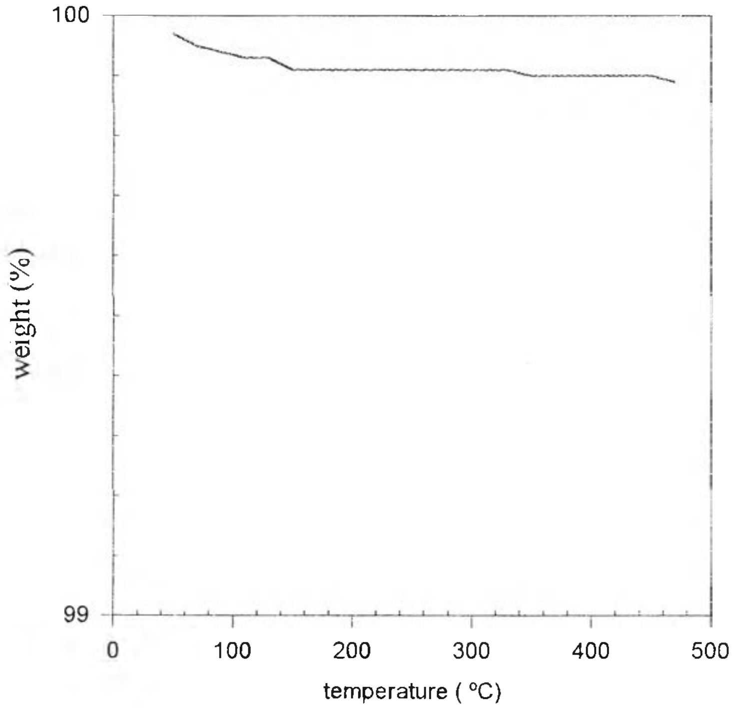


Figure C-1 TGA thermogram of silica (S5631) particles.

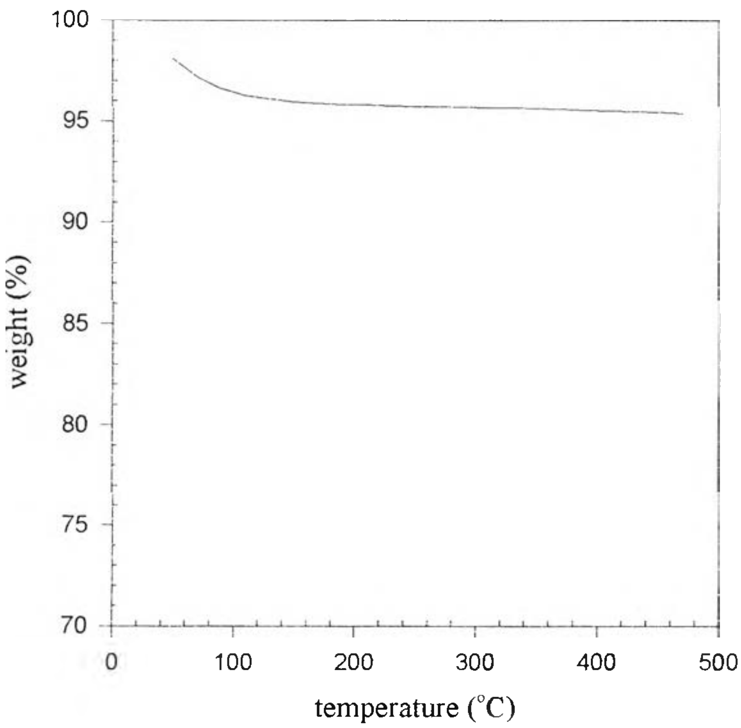


Figure C-2 TGA thermogram of silica (H927) particles.

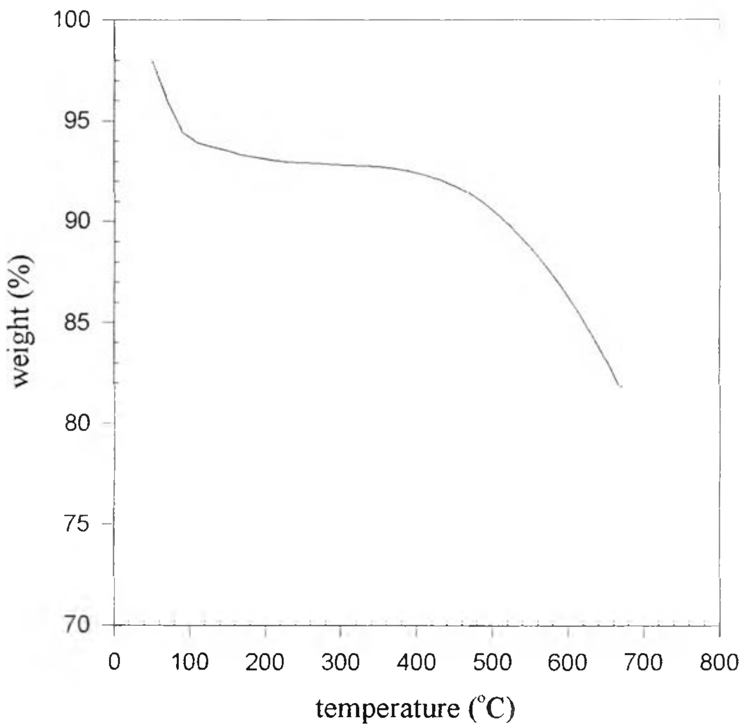


Figure C-3 TGA thermogram of PAN particles.

APPENDIX D ER Results of ER Fluids Based on Silica, PAN, and PAN-Coated Silica Systems

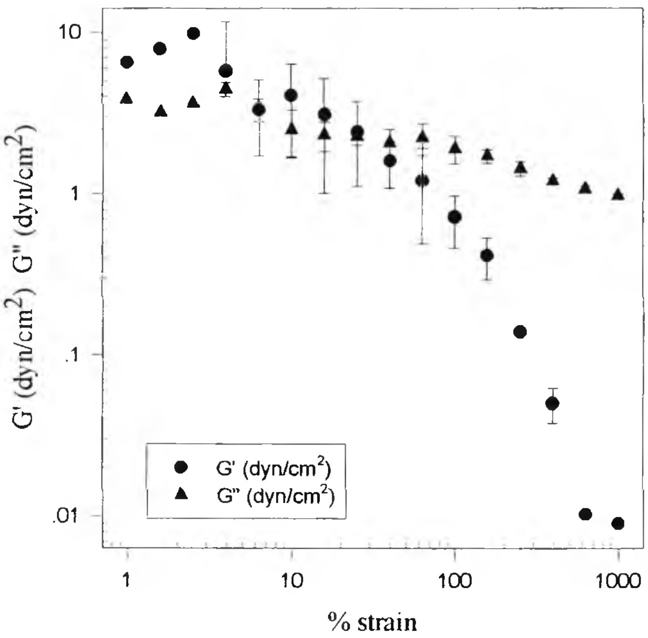


Figure D-1 G' and G" dependence on % strain of 5% wt silica (S5631) suspension at the electric field strength of 2 kV/mm.

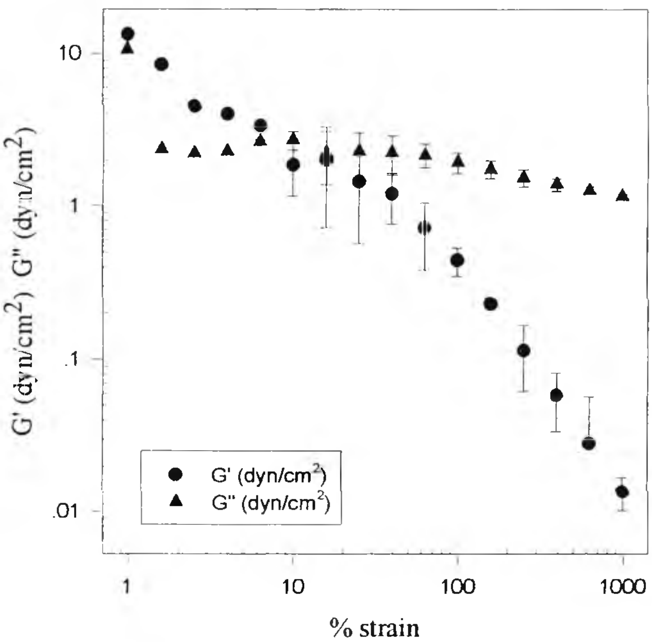


Figure D-2 G' and G" dependence on % strain of 10% wt silica (S5631) suspension at the electric field strength of 2 kV/mm.

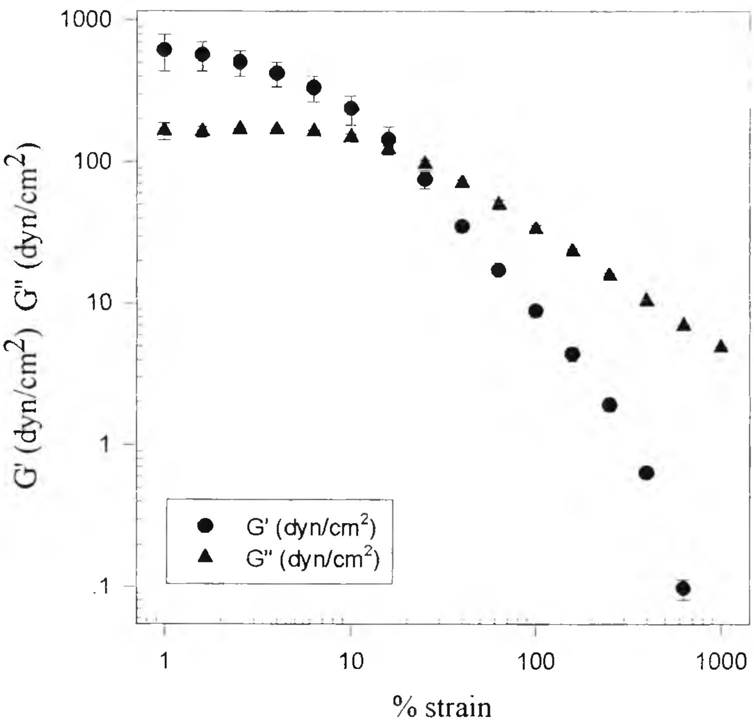


Figure D-3 G' and G" dependence on % strain of 40% wt silica (S5631) suspension at the electric field strength of 2 kV/mm.

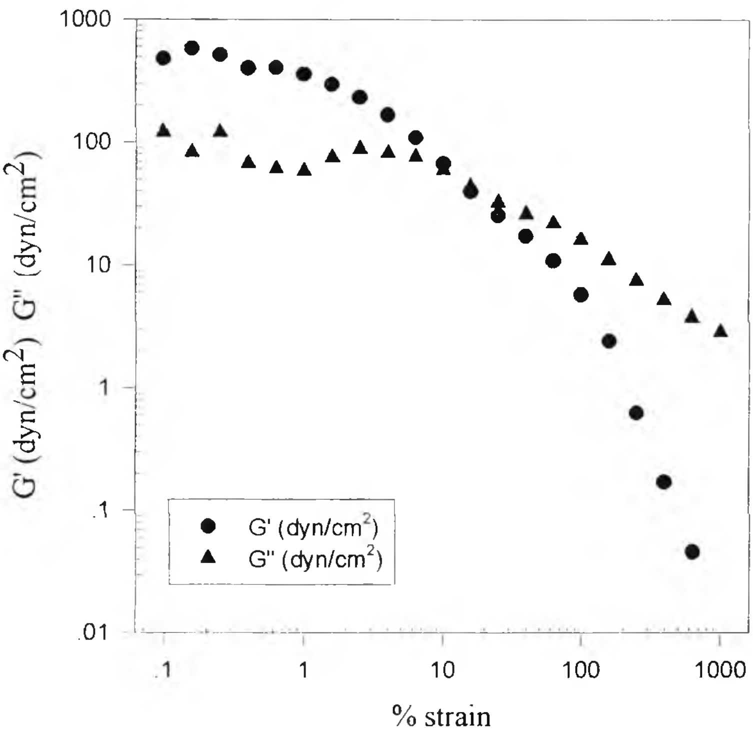


Figure D-4 G' and G" dependence on % strain of 5% wt silica (H927) suspension at the electric field strength of 2 kV/mm.

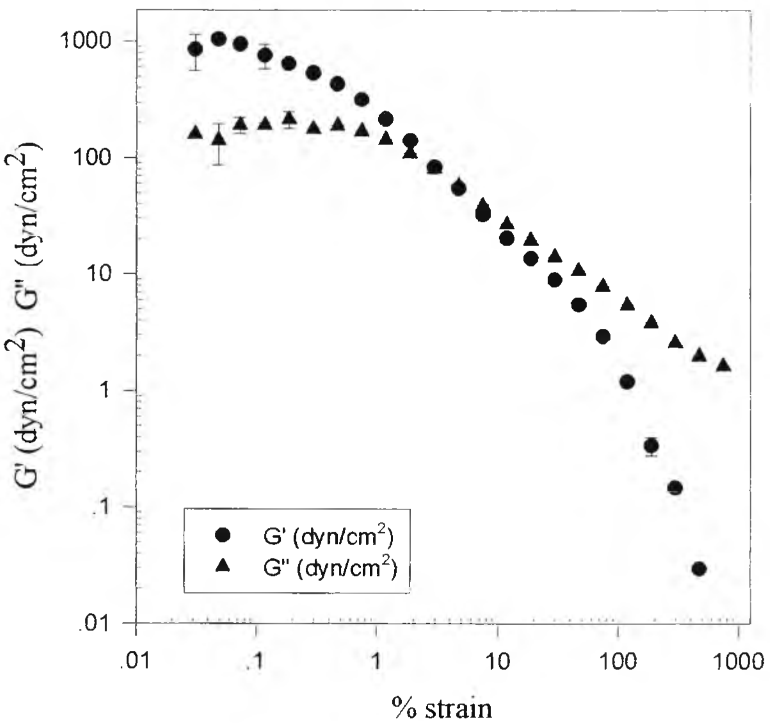


Figure D-5 G' and G" dependence on % strain of 5% wt PAN suspension at the electric field strength of 2 kV/mm.

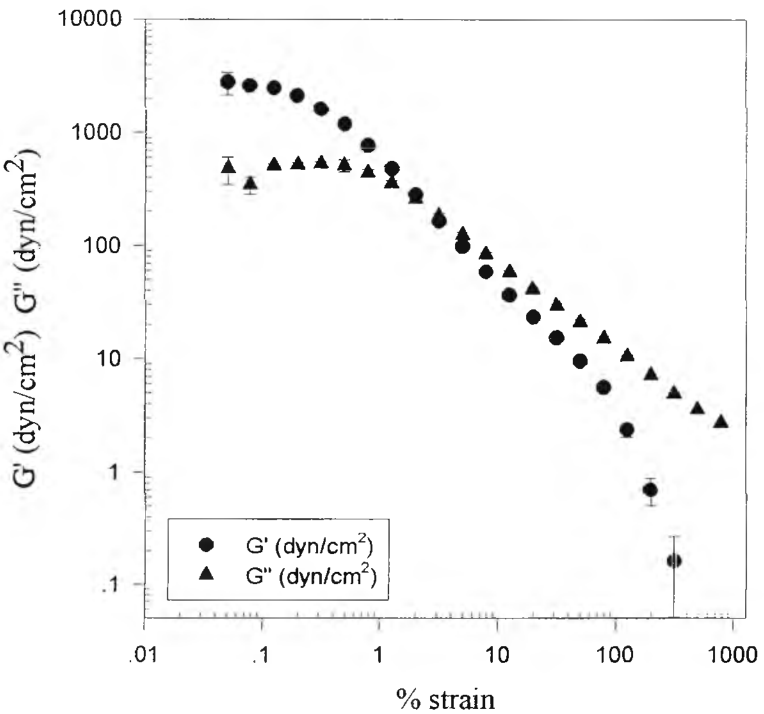


Figure D-6 G' and G" dependence on % strain of 10% wt PAN suspension at the electric field strength of 2 kV/mm.

Table D-1 $[G']_0$ and $[G'']_0$ * of ER fluids based on silica at the electric field of 0, 1, and 2 kV/mm at various %strains.

system	% wt	% strain	$[G']_0$ (dyn/cm^2)			$[G'']_0$ (dyn/cm^2)		
			E = 0 kV/mm	E = 1 kV/mm	E = 2 kV/mm	E = 0 kV/mm	E = 1 kV/mm	E = 2 kV/mm
Silica (S5631)	5	50	-	-	-	0.02	0.11	0.17
		600	-	-	-	0.02	0.07	0.08
	10	50	-	0.13	0.47	0.02	0.28	0.80
		600	-	-	-	0.03	0.05	0.08
	20	5	0.32	20.93	84.10	2.72	6.60	24.02
		600	-	-	-	0.20	0.80	1.39
	40	5	4.37	103.94	329.00	2.45	51.58	157.27
		600	-	-	-	1.51	5.05	17.45
Silica (H927)		50	-	12.11	23.62	7.87	20.72	32.86

* $[G']_0$ and $[G'']_0$ were obtained at the frequency of 0.001 rad/s.

Table D-2 $[G']_0$ and $[G'']_0$ * of ER fluids based on PAN at the electric field of 0, 1, and 2 kV/mm at various %strains.

system	% wt	% strain	$[G']_0$ (dyn/cm^2)			$[G'']_0$ (dyn/cm^2)		
			E = 0 kV/mm	E = 1 kV/mm	E = 2 kV/mm	E = 0 kV/mm	E = 1 kV/mm	E = 2 kV/mm
PAN	5	600	-	-	-	0.02	0.10	0.57
	10	600	-	-	-	0.03	0.24	1.16
	20	600	-	-	-	0.70	1.71	4.86

* $[G']_0$ and $[G'']_0$ were obtained at the frequency of 0.001 rad/s.

Table D-3 $[G']_0$ and $[G'']_0$ * of ER fluids based on PAN-coated silica (S5631) at the electric field of 0, 1, and 2 kV/mm at various %strains.

system	% wt	% strain	$[G']_0$ (dyn/cm^2)			$[G'']_0$ (dyn/cm^2)		
			E = 0 kV/mm	E = 1 kV/mm	E = 2 kV/mm	E = 0 kV/mm	E = 1 kV/mm	E = 2 kV/mm
PAN-coated Silica (S5631)	5	5	0.61	17.65	60.95	4.49	21.15	70.50
		600	-	-	-	0.97	0.65	0.60

* $[G']_0$ and $[G'']_0$ were obtained at the frequency of 0.001 rad/s.

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