

## CHAPTER IV

### CONCLUSIONS

The organosilicon copolymer of catechol and *t*-butylcatechol can be synthesized directly in one step called 'OOPS' process using TETA as the catalyst in EG solvent. The product is fine light yellowish powder insoluble in most organic solvents, but soluble in hot EG and DMSO. The reaction conditions, the mole ratio of raw materials, the reaction time and the percentage of catalyst, influence the characteristics of the product which are characterized by FTIR, EI<sup>+</sup>-MS, XRD, NMR and thermal analyses.

The structure of the product is confirmed by FTIR, NMR and MS data. There is more *t*-BUT present in the synthesized product as its added amount in the reaction is increased. The mole ratio of SiO<sub>2</sub>:cat:*t*-BUT is fixed at 1:2-X:X, where X is varied from 0.1 to 2.0. XRD data indicate that the product shows a crystalline phase at low mole ratios of *t*-BUT and more amorphous appears when the mole ratio of *t*-BUT is higher. DSC thermograms typically show 3 transition peaks, and TGA thermograms gives 2 mass losses of the decomposition of organic ligands and the organic residue. 20-40 %ceramic yield is obtained from the TGA data evaluation. Efficacious reaction cannot be attained with short reaction times of less than 3 hours and/or with low amounts of catalyst of less than 50 mole% of silica.