

CHAPTER V

CONCLUSIONS

Crystalline titanium silicates (TS-1) or zeolites are successfully one step synthesized using silatrane and titanium glycolate as starting materials via the sol gel process and hydrothermal treatment using microwave heating technique. Products obtained from these new precursors have nicer and more uniform crystalline with narrower particle size and particle size distribution in a shorter time.

Aging time of the reaction mixture prior to heating plays a very important role in the formation of TS-1. Complete conversion of SiTEA and titanium glycolate mixture to TS-1 crystals was obtained with longer aging time. However, heating reaction time also has an effect on SiTEA conversion, the longer heating reaction time results in the better conversion. Higher temperatures can be applied to curtail aging and heating times. As for the effect of NaOH, H₂O and TPA concentration, less perfect crystals of TS-1 are obtained when increasing NaOH, decreasing TPA concentration. The shape of TS-1 crystals appears to depend on the level of water present.

Microwave irradiation is successfully employed for the synthesis of Ti-rich (up to Si/Ti = 5.88) titanium silicates (TS-1) at a very rapid reaction rate. This is a substantial improvement compared to the post-synthesis method reported a framework substitution of titanium at very low loading (Si/Ti = 50-70) inside the silica framework of TS-1.