



## CHAPTER V

### CONCLUSIONS AND RECOMMENDATIONS

In this work, the chelating metal alkoxide precursors, cerium glycolate complexes, were successfully synthesized using the 'oxide one pot synthesis process' at very high yields. These precursors were produced from inexpensive and readily available starting materials, cerium hydroxide and ethylene glycol, in the presence of a base as catalyst. The ethylene glycol was used as solvent as well as a starting material.

Sol-gel process is the process that helps the organization of molecule  $\text{CeO}_2$ , to have a better orientation and surface area properties. Furthermore in this work high surface area cerium dioxide can be obtained by optimized important sol gel parameter.

By fixing the water content, in gel region, the higher acid molar ratio, the longer gel time. Even though acid catalyst in sol gel process can speed up hydrolysis reaction at appropriate amount, it slows down the condensation reaction resulting in increasing gel time was obtained. Moreover at the highest acid content narrow pore size distribution cerium dioxide was obtained, but at lowest acid content highest surface area was obtained.

The higher water molar ratio in turn reduced the hydrolysis and condensation rate, resulting in longer gel time. At each acid amount, decreasing the water content increased the gel time. The surface area exhibit correlate with gel time, the higher gel time, the lower surface area and pore volume.