

**PREPARATION AND CHARACTERIZATION OF  
ZIRCONIUM OXIDE**

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## **ABSTRACT**

### **PREPARATION AND CHARACTERIZATION OF ZIRCONIUM OXIDE**

Zirconium oxide has unique properties such as high melting point, good resistance to corrosion, low electrical conductivity and high dielectric constant. It has been gaining interest due to its diverse practical application in sensor, catalyst and ceramic material. This study is aimed to prepare and characterized zirconium oxide using the simplest method through hydroxide mediated method. Zirconium oxide was prepared using ratio 1:2 of zirconyl chloride octahydrate and sodium hydroxide as starting with concentration of 0.1 M and 0.2 M respectively. The characterization of zirconium oxide was done using Scanning Electron Microscope (SEM) to study the surface morphology and X-Ray Diffraction (XRD) for the crystallinity study. Using SEM, the sample was observed as agglomerated to some extent due to the nanoparticles getting closer to each other. The diameter of the zirconium oxide prepared was in the range of 1 – 5  $\mu\text{m}$  along with four elements present in the sample that is zirconium, oxygen and carbon from the surrounding and sodium from the starting material used earlier in the preparation process. For the crystallinity study using XRD, the diffraction peaks with plane observed are similar as reported in the standard data (JCPDS 74-1202) with crystal system obtained as orthorhombic. In conclusion, the zirconium oxide can be prepared using the simplest method with ideal ratio and concentration along with the optimum oven temperature.