

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

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PROJECT REPORT (2014-15)

On

"NOVEL METHOD OF SYNTHESIS OF DELAFOSSITE STRUCTURED NANO OXIDES & STUDY ITS PROPERTIES"

Submitted in Partial Fulfillment of the Requirement for the Award of the Degree of

**Bachelor of Engineering
in
Chemical Engineering**

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ABSTRACT

Transparent Conductive Oxides (TCOs) are simultaneously optically transparent and electrically conductive materials. TCOs continue to be in high demand for their immediate applications in a variety of new technologies ranging from photovoltaic to sensors. And it is classified into two major classes; p-type and n-type. n-type TCOs are most readily available and therefore more commonly found in practical applications. But, less work is done on p type. However, development of p-type TCOs is very required for making transparent electronics.

Hence, this project is focused on preparation of p- type TCO materials especially delafossite structured copper based oxides such as CuCrO_2 and CuFeO_2 by novel synthetic method, i.e Molten salt method. Powder –XRD, SEM and UV –DRS were recorded for prepared compounds to confirm phase, morphology and optical properties. Single phase CuFe_2O_4 is formed in eutectic mixture of NaCl –KCl flux at 800 °C and CuCrO_2 is formed in NaCl –KCl flux with minor phase of CuCr_2O_4 . The crystallize size of the both the compounds were calculated using Scherrer method and found to be in range of 60 - 80 nm. DRS studies confirm the optical transparency of the prepared delafossite compounds.