## Dopant Effect and Characterization of Poly (O-Toluidine)/Vanadium Pentoxide Composites Prepared by in Situ Polymerization Process

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## Abstract

Conducting polymer composites of poly o-toluidine/vanadium pentoxide (POT/V<sub>2</sub>O<sub>5</sub>) were synthesized by polymerization of o-toluidine with V<sub>2</sub>O<sub>5</sub> using (NH4)2 S2O8) as an oxidant. The V<sub>2</sub>O<sub>5</sub> is varied in five different weight percentages of POT in POT/V<sub>2</sub>O<sub>5</sub> composites. The synthesized polymer composites are characterized by dc conductivity; UV–Visible absorption spectroscopy, FTIR, Phototluminescence and XRD techniques. Electrical conductivity of the compressed pellets depends on the concentration of V<sub>2</sub>O<sub>5</sub> in POT. The optical band gap of composites decreases with increase in the weight percent of V<sub>2</sub>O<sub>5</sub>. X-ray diffraction pattern shows increases in the crystallinity which is due to interaction of POT with V<sub>2</sub>O<sub>5</sub>. The PL emission intensity of all the polymer/V<sub>2</sub>O<sub>5</sub> composites makes them suitable for various optoelectronic devices.

**Keywords:** Optical properties/techniques, Chemical properties, Defects, Electrical properties, Powder processing

## 1. Introduction

Conducting polymers have emerged as a very important class of materials because of their unique electrical, optical and chemical properties leading to the wide range of technological applications.

This class of materials provides tremendous scope for tuning of their electrical conductivity from semiconducting to metallic regime by way of doping [1, 2].

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