

# Novel Approach to Synthesis and Characterization of POT/ZnO nanocomposites

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**Abstract.** The novel *insitu* polymerization method has been used to synthesis poly o-toluidine/Zinc Oxide (POT/ZnO) nanocomposites with varying weight percentages (5, 10, 15, 20) of ZnO in polymer matrix. The structural properties of synthesized polymer has been discussed with XRD and SEM techniques and found that the crystallinity of the material increases with ZnO doping. Electrical conductivity of the compressed pellets of nanocomposites is depends on the concentration of ZnO in POT and found to increase upto five orders. The indirect bandgap of nanocomposites decreases with increasing ZnO.

## INTRODUCTION

For achieving the superior level of prepared competence, device incorporation, material suppleness, and footstep minimization, in attendance research momentum on nanostructures is gravely ambitious by the requirement for minimizing facial appearance. Among distinct nanomaterials, ZnO nanostructures have established considerable interest in the pasture of miniaturized electronics [1 - 2], and photovoltaics. Conducting polymer (CP) nanoparticles, nevertheless, has leading magnitude for a bulky gamut of research labors as polymers reveal unparallel litheness in dispensation capabilities. The electrical properties of these material can be tailored by oxidative and reductive doping, a standard possessions that has forever place these materials a stride to the front of their counterparts. At the identical time, steady anxieties for betterment request for the revise of speckled assortment of polymers. POT is perhaps the majority extensively explored plagiaristic of poly (aniline) that possesses outstanding processability as fine as high quality thermal and ecological stability [3]. In the current work, the author approached to alteration of electrical parameters due to rule of anionic radii of engaged dopants. Even though numerous researchers have found the possessions of dopant kind on polymeric properties, the exact feature of anionic size of dopants is not fine explored. The authors try to an offbeat effort taken ZnO nanoparticles as dopants [4].

## EXPERIMENTAL

### Synthesis of Poly (o-toluidine)

POT was synthesized via chemical oxidation method and APS was used as an oxidant with aqueous acid solution. 0.1 M solution of ammonium persulphate was added slowly with continuous stirring for 4–6 h at 0–5 °C into the 0.1 mol of O-toluidine monomer solution with acidic medium. The mixture was again cooled down below 4 °C for 24 hours. Polymer so obtained was filtered and washed two times with deionized water. The dark green colored POT powder was obtained after drying at 80 °C in oven for 2 h.