

CHAPTER-7 POLYMER NANOCOMPOSITES FROM WASTE THERMOPLASTICS**Ivaturi Siva Ramakoti¹, Achyut Kumar Panda², Narayan Gouda¹, P. Tejaswini Reddy¹**i.siva@cutm.ac.in¹ Centurion University of Technology and management, Odisha, India² Veer Surendra Sai University of Technology, Burla, Sambalpur, Odisha, India**Abstract**

With the increase in population leading to enormous usage of plastic that's causing a threat to environment it is highly necessary that the waste plastics are converted into valuable materials by upcycling processes. And one such process is preparation of polymer nanocomposites by recycling the waste plastics. As polymer nanocomposites have gained importance because of their unique properties like good thermal conductivity, high chemical stability, good optical properties and excellent mechanical strength and the changes in these properties is because of the large surface area of the nanoparticles which increases the interaction between the polymer and the nanoparticle. An overview of various waste thermo plastic polymers and synthesis of polymer based nanocomposites from them by melt mixing, solution mixing method is given in this chapter.

7.1 Introduction

Plastics are used all around the world extensively because of their properties which render so many benefits such as durability, light weight, availability cheapness etc. Plastics found use in many areas like packaging, constructions, electronic, automotive industries etc. But the main problem with these plastics is that they are not biodegradable and this causes them to stay on land and in sea for so many years generating a lot of amount solid waste which causes serious environmental pollution which is harmful for human, animal and aquatic life. And burning of these plastics to reduce this harmful impact plastic on environment, it is necessary to design methods to recycle the used waste plastics to useful valuable products and one such recycling method is the conversion of the used waste plastics to polymer nanocomposites which can be done by melting the plastic into polymer and then incorporating the melt with nanomaterials which render improvement in mechanical, electrical, optical, magnetic properties etc. In this chapter, we