

International Conference on

Polymer Science & Engineering

August 22-24, 2016 New Orleans, USA

Mechanical and nanoindentation studies on nano-layered silicate reinforced recycled glass-filled polyamide 12 nanocomposites

Mahdi Saud Alajmi¹, Shalwan¹ and B Aldousiri²¹College of Technological Studies, Kuwait²Department of Power & Desalination Plants, Kuwait City, Kuwait

Recently, recycling of thermoplastic polymers has become an alternative resource in industrial product manufacturing processes. This work is an attempt to enhance the mechanical and nanoindentation behaviors of recycled glass-filled polyamide-12 (RGP) by adding nano-layered silicate (Nanoclay) as reinforced filler. Tensile and nanoindentation tests were conducted to study the effect of various loading levels (0-7 wt%) of nano-layered silicate on the mechanical and nanoindentation behaviors of RGP and its nanocomposites. The recycled glass-filled polyamide-12 (RGP) and recycled glass-filled polyamide-12 reinforced with layered silicate (RGPS) were prepared using a single screw injection moulding technique. The wide angle x-ray diffraction (WAXD) was used to characterize the nanostructure of material and determine the intercalation/exfoliation for layered silicate in RGP matrix. This study has revealed that the layer silicate has a negative effect on the tensile strength and strain (ductility) of RGPS compared with RGP. Moreover, RGFS/5 wt% displayed the lowest tensile strength and strain values, with an average decrease of 54% compared with the RGP sample. However, nanoindentation results showed a remarkable improvement with addition of layered silicate to RGF. The average decrease in the max depth of penetration was 21%, while the average increase in the hardness was 92% for RGPS samples compared with RGP samples. The RGPS/3 wt% sample shows the optimum results in both resistance penetration and hardness of nanocomposites 1100 nm and 0.24 GPa, respectively.

Biography

Mahdi Saud Alajmi has completed his PhD from Brunel University in London-School of Design and Engineering. He is the Head of Manufacturing Engineering Technology at College of Technological Studies at PAAET. He has published more than 10 papers in reputed journals and has been serving as an Editorial Board Member of The International Conference of Manufacturing Engineering and Process (ICMEP).

ms.alajmi@paaet.edu.kw

Notes: