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Spectroscopic analysis of PMMA/PVC blends containing CoCl₂

By: Alghunaim, NS (Alghunaim, N. S.)^[1][View ResearcherID and ORCID](#)

RESULTS IN PHYSICS

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Abstract

Composites of polymethyl methacrylate (PMMA) and polyvinyl chloride (PVC) polymer blend containing different concentrations (≤ 10 wt.) of cobalt chloride (CoCl₂) were prepared by casting techniques. The changes of the structural, spectroscopic, optical and thermal parameters of the samples are studied using different tools. FT-IR spectroscopy confirmed the complexation between the blends and Co²⁺-ions. The decrease or increase of IR band intensity with some shifts of other bands suggests an interaction and compatibility between PMMA/PVC blends with CoCl₂ take place. The Ultra violet and visible (UV/Vis) spectra indicated that the presence of band gap energy depends on increasing of CoCl₂ contents. The absorption intensity of the samples doped with CoCl₂ becomes faint lower than the pure blend. The values of energy gap for direct and indirect transition decreases with the increase of CoCl₂ due to the presence of charge transfer between PMMA/PVC and CoCl₂. The thermogravimetric analysis (TGA) curves for all the samples have the same behavior and more steps of decomposition were observed. The reduction of mass loss for samples containing CoCl₂ compared to the pure blend was observed and it was attributed to crosslink formation between the blend and CoCl₂. (C) 2015 The Author. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

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Author Information

Reprint Address: Alghunaim, NS (reprint author)

+ King Abdulaziz Univ, Fac Sci, Dept Phys, Jeddah, Saudi Arabia.

Addresses:

+ [1] King Abdulaziz Univ, Fac Sci, Dept Phys, Jeddah, Saudi Arabia

E-mail Addresses: n-al-ghunaim@hotmail.com

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