

INVESTIGATIONS ON ESR SPECTRA IN POLY(PARAPHENYLENE)

Chang Qing Jin, Liu Kun Wang, Changchun Institute of Physics,
Academia Sinica, Changchun 130021, Jilin, China.

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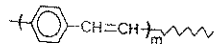
ABSTRACT

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INTRODUCTION

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An ESR experimental study of poly(paraphenylene) (PPP), PPP was synthesized by the method of Kovacic is presented. Doping was carried out by exposing PPP powders to the vapour of iodine at 120 °C and with a pressure of 10⁻⁴ mmHg. Rare earth Tm³⁺ and Sm³⁺ ions were doped into PPP films by means of ion implantation. ESR spectra and σ_{dc} of these samples have been measured as a function of dopant concentration and temperature. The results show that in the case of doped PPP, spin chargeless or charged polarons or charged spinless bipolarons can be formed in the chain of PPP due to doping. At the low doping levels [1], N_{spin} increases due to the formation of polarons which carry spins. At higher levels, the spinless bipolarons dominate leading to a strong reductions in N_{spin} . This interpretation is in agreement with our results of ESR spectra. The observed shift in the g-factor due to doping could be caused by a spin orbit interaction between the polaron and the dopant molecule. The conduction mechanism can be accounted for by polarons or bipolarons.

REFERENCE

1. P. Bernier, Mol. Cryst. Liq. Cryst , 83, 57(1982).