

Novel Magnetic Properties of Pyrolyzed 2,4,6-Triphenoxy-1,3,5-Triazine and Phenylenediamine

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By the pyrolysis of the mixture of 2,4,6-triphenoxy-1,3,5-triazine (TPTA) and phenylenediamine (PDA) at temperatures of 500–1000°C, a small fraction of a ferromagneticlike part has been obtained. The spin concentration of these materials has been examined by ESR measurement. The sample prepared at 600°C exhibits the largest value of 4.4×10^{19} spins/g. Most of these spins obey the Curie-Weiss law. The mixture of TPTA and m-PDA gives a larger content of the ferromagneticlike part by pyrolysis than does the mixture of TPTA and p-PDA or o-PDA.

1. Introduction

Current research on organic ferromagnets has attracted intense interest from both experimental and theoretical sides. The magnetic properties of the materials prepared from organic compounds by chemical synthesis and pyrolysis have been investigated,⁽¹⁻⁶⁾ and it has been asserted that some of these materials are organic ferromagnets.^(1,3) However, reproducibility of the materials with superior properties has been disturbed because of a low ferromagnetic fraction.

Ovchinnikov and Spector have proposed two-dimensional ferromagnetic polyradicals based on the graphite-net motif, in which some carbon atoms in a graphite net are substituted by three valence atoms, such as N and B.⁽³⁾ Dixon and Miller have suggested that the derivatives from triazines may give a high spin state.⁽⁷⁾ However, an experiment to synthesize them has never been performed.