

INTERCALATION OF CONDUCTING POLYMERS WITHIN LAYERED MATERIALS

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Inorganic/organic heterostructure materials have attracted much attention of the research community as a result of potential applications of these interesting advanced materials. More importantly, these materials can be synthesised relatively easily by simple wet chemical methods as opposed to sophisticated vapour deposition techniques generally required for inorganic/inorganic quantum-well type heterostructure materials.

During this work, we have developed wet chemical methods to exchange protons in the interstitial sites of bentonite, a layered clay material, with various metal ions, ammonium ions, and organic cations. The d-spacings of the resulting modified clay materials were measured by powder XRD technique. The anilinium-exchanged bentonite was treated with a strong oxidant and the anilinium ions entrapped within interstitial spaces were polymerised accordingly. The resulting material has a dark green colour and measurable electronic conductivity. These materials were also characterised by UV-visible absorption spectroscopy, FTIR spectroscopy, and AC impedance measurements. In this communication, we present novel techniques developed in our research group for the preparation of clay/conducting polymer heterostructure materials and their characterisation using several physical techniques.

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