

SCIENCE SEMINAR

ORGANISED BY

THE DEPARTMENT OF CHEMISTRY AND PHYSICS



Date: **October 21, 2005**

(Friday)

Time: **1:30 PM**

Place: **Oxendine Science Building, Room No. 3256**

Title:

“Towards Multifunctional Materials: The Chemistry And Properties Of Heterometallic Solids”

Speaker: **Dr. Paul A. Maggard**
Assistant Professor of Chemistry

ABSTRACT: Syntheses of heterometallic solids opens up novel investigations into the synergy or dissonance of the chemistries of dissimilar transition metals (e.g. V^{5+}/Co^{2+} or Ti^{4+}/Fe^{3+}). Our research efforts have employed low-temperature hydrothermal and flux methods aimed at these multifunctional solids, which include new visible-light photocatalysts and pillared hybrid solids. Expression of each of these structures/properties can arise from the combined effects of d^0 with d^n transition metals. The first part of the seminar will focus on the synthesis and properties of novel pillared solids which contain late transition metals (Co^{2+} , Ni^{2+}) that have been structurally stabilized towards ligand removal via organic pillars to metal-oxide layers (e.g. $AgReO_4$). The discussion will also include the origin of chirality in, and properties of, a new helically-pillared Cu analogue in this series. A second section of the presentation, time permitting, will focus on the synthesis of new early/late transition metal oxides in structural formats that are either ordered (nanocomposited) or disordered (solid solution). Owing to the presence of dissimilar d-electron counts, some of these have shown remarkable potential for the photocatalytic production of H_2 from sunlight and water, whereas others are being investigated for their unusual combination of ferroelectric and magnetic properties.