

## New open-framework yttrium oxalates with structure-directing amines

R VAIDHYANATHAN, S NATARAJAN and C N R RAO  
Chemistry and Physics of Materials Unit, Jawaharlal Nehru Centre for  
Advanced Scientific Research, Jakkur, Bangalore 560 064, India

Microporous open-framework solids have gained importance on account of their potential utility in catalysis and ion-exchange studies. A large number of metal phosphates as well as a few metal oxalates are known to form such open-framework structures. Here we report the synthesis of two entirely new open-framework oxalate structures formed in the presence of structure-directing organic amines. The compound **I**,  $[\text{Y}(\text{C}_2\text{O}_4)_2][\text{C}_3\text{H}_{11}\text{N}_2]$ , has an eight-coordinated yttrium. The yttrium and oxalate linkages give rise to a three-dimensional structure with 12-membered (6Y and 6 oxalates) honeycomb-like apertures along both *x*- and *z*-axes. Another 8-membered (4Y and 4 oxalates) channel is seen along the *y*-axis. The amine molecules are located in the 12-membered channel. In compound **II**,  $[\text{Y}_2(\text{C}_2\text{O}_4)_4(\text{H}_2\text{O})_2][\text{C}_3\text{H}_{12}\text{N}_2].4\text{H}_2\text{O}$ , yttrium is nine-coordinated. The yttrium and oxalate ions are so connected as to form a three-dimensional structure with 12-membered (6Y and 6 oxalates) channels along *x*-, *y*- and *z*-axes, within which the amine and water molecules reside. Both the structures **I** and **II** are stabilized by extensive hydrogen bonding between the amine, the water and the framework. The compound **II** may adsorb water reversibly. Further work in this direction is in progress.