

Phage fibre proteins may also find applications in nanotechnology or in recognition of pathogenous bacteria and their elimination (phage therapy).

Bacteriophage T4 contains six short and six long fibres. The long fibres are responsible for initial host cell recognition. They contain a trimer of gp34, a single copy of gp35, a trimer of gp36, and a trimer of gp37. T4 fibre proteins need the chaperone gp57 for correct folding. Gp37 also needs a second chaperone, gp38. We have expressed gp37 by co-expression with gp57 and gp38 and solved the structure of the gp37 receptor-binding needle domain.

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### New copper based MOF's built up from 1,2,3,4-cyclobutanetetracarboxylate ligand.

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One of the areas of solid-state chemistry that has shown remarkable growth over the last two decades concerns the synthesis and characterization of metal-organic magnetic materials (MOFs). As part of our ongoing study of molecular materials, we reported several studies of correlation between crystal structure and magnetic properties in a tetracarboxylate ligand with different metal ions [1]. In this communication we report the current studies with the 1,2,3,4-cyclobutanetetracarboxylate ligand (cbt)<sup>4-</sup>. Three new copper(II) metal-organic compounds have been synthesized using the gel technique varying the stoichiometry of the reaction in an effort to prepare low density frameworks [2].

The [Cu<sub>2</sub>(cbt)(H<sub>2</sub>O)<sub>4</sub>].2H<sub>2</sub>O (**1**) complex is built up by two different inorganic tapes: one formed by dinuclear copper(II) assemblies, and a second one formed by triple-bridge copper(II) regular chains. These inorganic tapes are kept together through the cbt that acts as a connector in a hexakis-monodentate way, giving rise to a 2D structure. The [Cu<sub>2</sub>(cbt)(H<sub>2</sub>O)<sub>4</sub>].2H<sub>2</sub>O (**2**) compound presents a 3D structure where the cbt acts as pentakis-monodentate, giving rise to a porous structure with two different types of square channels running along the *c*-axis. Crystallization and coordination water molecules are allocated in the bigger channels, while in the small ones there are only coordination water molecules. The [Cu<sub>3</sub>(cbt)<sub>2</sub>(OH)<sub>2</sub>(H<sub>2</sub>O)<sub>8</sub>].8H<sub>2</sub>O (**3**) compound presents a crystallographically independent cbt acting simultaneously as hexakis-monodentate and bidentate. This intricate coordination mode produces a 3D porous crystal structure, with cavities along the *b*-axis where the crystallization water molecules are allocated.

Here we present the X-ray single-crystal diffraction studies, the thermogravimetric analysis, and the magnetic studies of this new family of MOFs that opens new possibilities in the field of multifunctional materials.

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### Preparation and molecular structure of the complex [Sn<sup>IV</sup>(C<sub>44</sub>H<sub>28</sub>N<sub>4</sub>)(OCN)(OH)]

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For a review of porphyrin complexes [1] and For the synthesis of tin(IV) porphyrin species [2].

The title complex, [Sn<sup>IV</sup>(C<sub>44</sub>H<sub>28</sub>N<sub>4</sub>)(OCN)(OH)], exhibits substitutional disorder of the OH<sup>-</sup> and OCN<sup>-</sup> axial ligands. The Bis[(cyanato-*O*)(hydroxo)(0.5/0.5)][(5,10,15,20-tetraphenylporphyrinato-κ<sup>4</sup>N)tin(IV)] has been synthesized and characterized by UV-vis, IR and proton NMR and the tin ion presents the oxidation state IV, Thus, the cyanato-*O* ligand and the hydroxyl group bonded to the central Sn<sup>IV</sup> atom share statistically the axial position. The X-ray molecular structure shows that the Sn<sup>IV</sup> ion is hexacoordinated by the four N atoms of the pyrrole rings of the tetraphenylporphyrin (TPP) and the O atoms of the two disordered OCN<sup>-</sup> and OH<sup>-</sup> axial ligands. The equatorial tin-pyrrole N atom distance (Sn—Np) is 2.100 (2) Å and the axial Sn—O(OCN) or Sn—O(OH) bond length is 2.074 (2) Å. The complex [Sn<sup>IV</sup>(C<sub>44</sub>H<sub>28</sub>N<sub>4</sub>)(OCN)(OH)] crystallizes in the monoclinic space group *P2<sub>1</sub>/c* with unit cell dimensions a=11.2943(6) Å, b=12.6972(7) Å, c=13.0711(8) Å, β=114.251(2)°. The structure was refined to R=3.9%, WR2=9.7% and S=1.13.

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### Development of Cubic Anvil Type High Pressure Apparatus for Neutron Scattering at Low Temperature

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In recent years, as an important physical measurement device, various types of high pressure apparatus have been developed for each experimental purposes [1]. Among them, cubic (multi) anvil type apparatus is more suitable for good-hydrostatic pressure [2]. Another merit of this apparatus is that which has relatively large sample space. On the other hands, in the field of neutron experiments, high pressure technique is less common compared to other experiments due to the inevitable difficulty, such is a significant decrease in intensity by absorption and scattering when the neutrons pass through a pressure device which surrounds the sample: it is difficult to conduct experiments with reliability and accuracy.