Self-assembled composites of anionic Zn(salen) complexes and triphenylmethane derived polycations as catalysts for the addition of CO$_2$ to epoxides

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The combination of compounds 1 and 2 in different proportions generated a set of assembled supramolecular ionic composites (3-5) (Scheme 1).

Scheme 1.

For compound 3, the crystal structure is determined (Figure 1). It is constructed of rather short layers of polyanions composed of several molecules of 2 interconnected by their sulphonate groups coordinated at the apical positions of the neighboring central metal ions. The countercations of 1 were positioned between the layers. The powder X-ray diffraction pattern of composite 3 is shown in Figure 2. The experimental (blue curve) and calculated based on the single-crystal X-ray structure (red curve) powder patterns are similar. Composite 3 was also analysed by nitrogen porosimetry. It was found to contain mesopores and macropores with a BJH adsorption average pore radius of 10.4 nm, a BET surface area of 39.3 m$^2$ g$^{-1}$ and a BJH adsorption pore volume of 0.2 cm$^3$ g$^{-1}$.

Figure 1.  Figure 2.

The heterogeneous system 5 was catalytically competent in the reaction between styrene oxide and carbon dioxide and its activity also increased on its reuse.

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