

HYBRID ORGANIC-INORGANIC FILMS BY ASSEMBLING OF Si-Zr-BASED NANOBUILDING BLOCKS

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The possibility of combining inorganic and organic components at the nanosize level in a single material by the sol-gel process has made possible the development of new multifunctional materials. However, the phase interaction between organic and inorganic moieties can be controlled only to a limited extent by using hydrolysis-condensation reactions of metal alkoxides. On the other hand, the preparation of nanostructured organic-inorganic (O/I) materials by assembling of nanobuilding blocks (nbb) allows controlling the extent of phase interaction, which in its turn governs the structure-properties relationships. In order to tuning the physical properties, a suitable method is the preparation of inorganic nanosized preformed objects exploiting the features and the reactivity of functional end-capping organic groups.

We present here the synthesis of Si- and Zr-based nanobuilding blocks prepared by reacting diphenylsilanediol and different Si and Zr precursors, with M-OR or M-Cl functions. The non-hydrolytic condensation between silanols and alkoxide or chloride groups has been exploited in the presence of different catalysts in order to obtain the Si-Zr-based nbb. These nanosized objects have been further processed for preparing films by spin coating of suitable solutions. The structural characterisation of prepared nbb and films has been obtained by different spectroscopic techniques (mainly FTIR and NMR).

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