in Nanoporous Materials, edts. A. Sayari and M. Jaroniec,
World Scientific, Singapore, 2008, pp 55 - 62.

DEPOSITION AND CHARACTERISZATION OF FUNCTIONAL NANOPARTICLES OF LEAD-ZIROCNIA TITANATE (PZT) IN MATRICES OF MESOPOROUS SILICA OF MCM-48-TYPE STRUCTURE[1]

VIJAY NARKHEDE AND HERMANN GIES[†]

Chair of crystallography
Inst. of Geology, Mineralogy and Geophysics
Ruhr-University Bochum, 44780 Bochum
Germany

For the first time MCM-48 was used as the matrix for size-confined lead zirconate-titanate $PbZr_xTi_{(1-x)}O_3$ (PZT) , where x is varied from 0 to 1. PZT gel prepared using a co-precipitation method was introduced into the channels of MCM-48 by dip wet impregnation technique. Calcination in air led to the formation of PZT in the pores of MCM-48. All the synthesized composites were characterized by means of XRD, TEM, BET and AAS. No Bragg-peak due to the PZT was observed in the wide angle XRD pattern, indicating the particle size of the encapsulated PZT is below 2 nm. TEM and N_2 adsorption measurements further confirm the deposition of nanosized PZT particles inside the pores of the mesoporous matrix without destroying their integrity. AAS analyses reveal both the metal composition and the loading of ca. 11 to 16 wt% of the encapsulated PZT.