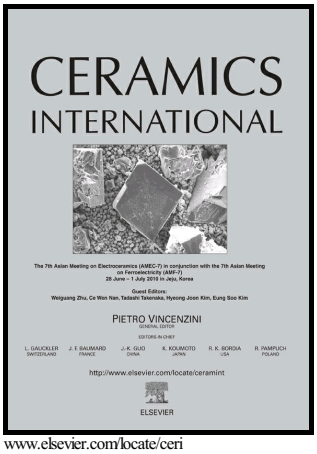

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Abstract

Vanadium doped ZnO macroporous structures are synthesized using solution combustion method. The as-burnt $Zn_{1-x}V_xO$ (x = 0, 3 mol %) foams are crushed and ground in agate mortar and pestle and calcined at 450^oC/1 h for further characterization. The structural study using XRD confirms the wurtzite phase of ZnO having hexagonal structure. The crystallite size is found to decrease from 28 nm to 11 nm on account of addition of vanadium. Grain size and grain boundary modification along with hierarchical porous structures are depicted using SEM micrographs. Further elucidation on the porous nature is made through BET. Quantitative and qualitative determination of intentional and unintentional dopants is estimated. Vibrational spectral studies elucidate the marked role of vanadium's infusion into the lattice and subsequent modification of grain boundary. An order of magnetic enhancement is achieved as illustrated by ambient and low temperature magnetization measurements. Role of vanadium doping on the grain boundary modification are brought to lime-light with structural, morphological and vibrational studies and the same is accounted for the observed magnetic property.

Key words: Combustion synthesis, Porous nanoparticles, Anti-ferromagnetic ordering, Grain boundary, Band gap.