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(54) **Title:** NANO-STRUCTURED COMPOSITE MATERIALS BASED ON COMPOSITIONS OF MANGANESE AND CERIUM, USABLE AS OXIDATION CATALYSTS AND/OR MOLECULAR ADSORBERS

(57) **Abstract:** The present invention concerns a nano-structured composite material based on compositions of manganese and cerium, composed of aggregated composite nanospheres, ranging in size from 1 to 40nm, of ultrafine crystalline nanoparticles of one or more compounds of cerium, dispersed in a metastable solid mixture of one or more sub-stoichiometric oxides of manganese, said sub-stoichiometric oxides of manganese comprising MeMnO_z manganates, wherein $1 < z < 4$, Me being constituted of one or more elements selected amongst alkali metals, alkaline earth metals, transition metals and rare earths, and in particular being constituted of one or more elements selected amongst Ce, V, Ti, Cr, Fe, Cu, Zn, Sn, Ga, Gd, Y, Zr, Al, Si, La, K, Li, Pb, Cs, or mixtures thereof; which can be used in the industry as redox catalyst and/or adsorbing filter of heavy metals, cyanides, sulfur compounds, pigments, dyes, polymers (PEG), phenols, alcohols, aldehydes and ketones, ethers, esters and carboxylic acids which are present both in contaminated water and in gas streams. The invention additionally concerns two alternative processes for the production of said nano-structured composite material and the use of said material as catalyst and/or adsorbing filter.



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