Title: A new chemical route to synthesise TM-doped (TM = Co, Fe) TiO2 nanoparticles

Author(s): Nunes, Manuel R.[4,3]; Monteiro, Olinda C.[4,3]; Castro, Ana L.[4,3]; **Vasconcelos, Duarte A.**[2,1]; **Silvestre, Antonio J.**[2,1]

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Abstract: Since the discovery of ferromagnetism well above room temperature in the Co-doped TiO2 system, diluted magnetic semiconductors based on TiO2 doped with transition metals have generated great interest because of their potential use in the development of spintronic devices. The purpose of this paper is to report on a new and swift chemical route to synthesise highly stable anatase single-phase Co- and Fe-doped TiO2 nanoparticles, with dopant concentrations of up to 10 at.-% and grain sizes that range between 20 and 30 nm. Complementary structural, microstructural and chemical analyses of the different nanopowders synthesised strongly support the hypothesis that a homogeneous distribution of the dopant element in the substitutional sites of the anatase structure has been achieved. Moreover, UV/Vis diffuse reflectance spectra of powder samples show redshifts to lower energies and decreasing bandgap energies with increasing Co or Fe concentration, which is consistent with n-type doping of the TiO2 anatase matrix. Films of Co-doped TiO2 were successfully deposited onto Si (100) substrates by the dip-coating method, with suspensions of Ti1-xCOxO2 nanoparticles in ethylene glycol. ((C)Wiley-VCH Verlag GmbH & Co. KGaA, 69451 Weinheim, Germany, 2008).

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Reprint Address: Silvestre, AJ (reprint author), Inst Super Engn Lisboa, R Conselheiro Emidio Navarro 1, P-1959007 Lisbon, Portugal.

Addresses:
1. Inst Super Engn Lisboa, P-1959007 Lisbon, Portugal
2. ICEMS, P-1959007 Lisbon, Portugal
3. Univ Lisbon, Dept Chem & Biochem, Fac Sci, P-1749016 Lisbon, Portugal
4. CCMM, P-1749016 Lisbon, Portugal

E-mail Address: asilvestre@deq.isel.ipl.pt

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