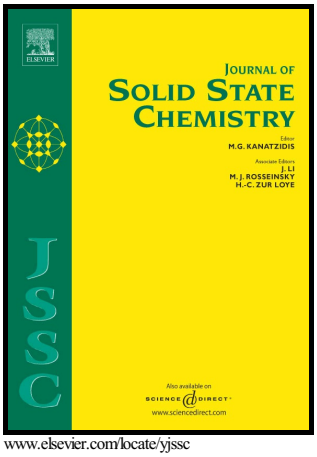

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Regulation of deprotonation of 3,3-di(1H-tetrazol-5-yl)pentanedioic acid: solvothermal synthesis of La(III) and heterometallic La(III)/Cu(II) compounds for ablation of A549 cells

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Abstract

3,3-di(1H-tetrazol-5-yl)pentanedioic acid (H_4dtzpda) can display tunable valence when reacted with different metal ions because it has four acidic hydrogen atoms of both tetrazole rings and carboxylate groups. Solvothermal reactions of H_4dtzpda with $La(NO_3)_2{\cdot}6H_2O$ or $La(NO_3)_2{\cdot}6H_2O/Cu(NO_3)_2{\cdot}6H_2O$ afforded a one dimensional $[La(Hdtzpda)(H_2O)_4]{\cdot}4H_2O$ (**1**) and a three dimensional $[La_2Cu(dtzpda)_2(H_2O)_{10}]{\cdot}4H_2O$ (**2**), respectively, where only three acidic hydrogen atoms of H_4dtzpda are deprotonated in compound **1** while all the four acidic ones are deprotonated in compound **2**. In compound **1**, $Hdtzpda^{3-}$ is a penta-dentate ligand to bridge La(III) centers *via* only oxygen atoms of the carboxylate group while in compound **2**, $dtzpda^{4-}$ is a hepta-dentate one *via* not only the oxygen atoms of the carboxylate group but also the nitrogen atoms of the tetrazole rings. PEG_{-5000} (poly(ethyleneglycol$_{-5000}$)) coated compound **1** or **2** nanoparticles (NPs) have good

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