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Magnetic properties of FePd nanoparticles

Nguyen Hoang Luong
Vietnam National University, Vietnam

FePd nanoparticles with the structure type $L1_0$ are one of the candidate materials suitable for ultra-high density magnetic storage applications due to their large uniaxial magnetocrystalline anisotropy and good chemical stability. In previous studies, FePd nanoparticles were prepared by various methods, however the ordered $L1_0$ phase transition varies with preparation methods. In this work, we present our study on magnetic properties of FePd nanoparticles prepared by sonoelectrodeposition and sonochemistry. Under the effect of annealing at various temperatures from 450°C to 650°C, structure change was observed and samples show good hard magnetic properties. Magnetic properties of the samples were systematically discussed in dependence of composition and annealing temperature.

luongnh@vnu.edu.vn

The inPSMence of thermal mass on thermal comfort

Masoud Sajjadian
University of Liverpool

Thermal comfort is crucial to ascertain the energy consumption in buildings and is a key factor for decision making in the design of sustainable building envelopes. This study presents a methodology to assess the combined performance of thermal mass and insulation thickness quantitatively on the basis of their impact on thermal comfort. A framework is proposed to deal with the risk of climate change temperature increases in the UK. Initially, a simple building model with five of the most commonly used, high performance construction systems for dwellings was examined for a range of low, medium and high thermal masses and afterwards systems were applied to a typical UK flat. Furthermore, the study used novel integration of phase change materials (PCM) with air gap to provide high level of thermal mass on a light system and quantified the effect. Manchester and London were the sites chosen for the modeling and current and future climate scenarios were examined. The dynamic thermal simulation used the software Design Builder, which employs EnergyPlus as its calculation engine. In essence, the study establishes a new approach for the assessing the performance of thermal mass and insulation thickness on the basis of overall annual thermal comfort hours.

S.Sajjadian@liverpool.ac.uk

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