# Specific Heat Capacity of LaSrMnO Nanomaterial Systems

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The materials $La_ySr_zMnO_{3-x}$ (LSMO) (y=07; 0,75;0,8); (z=0,2; 0,3); (x=0,2; 0,8; 1) play an important role in phase change memory (PCM) devices, in which data are digitized using the difference between specific heat capacity of $La_ySr_zMnO_{3-x}$ in crystallized and amorphous states. The phase transformation between crystal and amorphous states is controlled by Joule – heating and cooling processes, and thus accurate data for the specific heat capacity for $La_ySr_zMnO_{3-x}$ are indispensable to stricter design of PCM devices. There have been a few data reported for specific heat capacity of LaSrMnO nano-materials, however additional measurements are necessary to obtain more reliable values. Consequently, the present work aims to determine the specific heat capacity of some bulk materials for La-Sr-MnO systems. The thermophysical properties are the basic parameters for the selection of new substitute fuel and fuel additives. As one of the thermophysical properties, the mass diffusion coefficient has a close relationship with research on spray, atomization and combustion processes of combustion engines, and it is also a key parameter for numerical simulation of combustion processes. Lime-based composites contain a significant amount of pores of different site that can be filled either by air or water. Therefore, both the total pore volume and the distribution of pores can effect their specific heat capacity in a very significant way. In this paper the effects of the amount and the site of the pores on specific heat capacity are studied in the conditions when these are either employ or partially or fully filled by water. The shape memory and super-elasticity effects are generated through the variation in the micromechanical-thermodynamic state of the material, the micro-parameters of which are co-dependent. Engineering applications using nanomaterials require reliable techniques to model such macro-mechanical phenomena to predict the strongly–coupled thermal and mechanical performance, so as to integrate LaSrMnO actuators into the specific design. In this work, the correlation between specific heat and hysteretic thermomechanical behaviour of LaSzMnO nanomaterials is examined by both experiments and numerical modeling.