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Effect of Ultrafast Thermal Quenching on $Nd_{0.67}Sr_{0.33}MnO_3$[1] A. MANSOUR, KH ZIQ, A. SALEM, King Fahd University of Petroleum and Minerals, R. MANSOUR, University of Dammam — We have successfully performed an ultrafast thermal quenching of $Nd_{1-x}Sr_xMnO_3$ (x=0.33) from 1200°C down to -196°C in a fraction of a second, at ambient pressure. This allowed us to freeze and investigate the physical properties of the material that have been formed at high temperatures. Resistivity measurements showed a 27 K reduction in the metal-insulator transition (MIT) temperature of the quenched sample compared to the as-grown sample. Whereas magnetic measurements revealed <2 K shift in the antiferromagnet-ferromagnet (AFM-FM) transition temperature with a significant broadening in the AFM-FM transition accompanied with a decrease in the low temperature magnetization. Moreover, ultrafast quenching significantly widens the temperature range of the magnetoresistance(MR) from few degrees to over 200 K. Here we present physical interpretations of the results in accordance with X-ray and structural analysis.

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A. Mansour
King Fahd University of Petroleum and Minerals

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