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Spin dynamics of $La_{0.845}Sr_{0.155}Mn_{1-x}M_xO_3$ (M = Mn, Cu, Co) perovskites MANH-HUONG PHAN, HARIHARAN SRIKANTH, Department of Physics, University of South Florida, Tampa, FL 33620, THE-LONG PHAN, Micro- and Nano-Structures Group, H. H. Wills Physics Lab, University of Bristol, Bristol BS8 1TL, UK — Influence of the spin-lattice coupling on the magnetoresistance and magnetocaloric properties of $La_{0.845}Sr_{0.155}Mn_{1-x}M_xO_3$ (M = Cu, Co) perovskites has been investigated by means of electron spin resonance (ESR) spectroscopy. It was observed that asymmetrical ESR signals due to ferromagnetic correlations at temperatures $T < T_{min}$ became Lorentzian at $T > T_{min}$, where T_{min} corresponds to the narrowest ESR linewidth. The temperature dependence of the ESR intensity, I(T), for the samples was well described by an expression of $I(T) = I_o \exp(E_a/k_B T)$. In the high temperature region, 1/I(T) obeyed the Curie-Weiss law. The minimum linewidth, ΔH_{min}, was determined to be 674, 890 and 750 Oe for $La_{0.845}Sr_{0.155}Mn_1O_3$, $La_{0.845}Sr_{0.155}Mn_{0.9}Cu_{0.1}O_3$ and $La_{0.845}Sr_{0.155}Mn_{0.98}Co_{0.02}O_3$, respectively. This indicated an improvement of the spin-lattice coupling in samples with Cu or Co addition. The strongest spin-lattice coupling resulted in the largest magnetocaloric effect in $La_{0.845}Sr_{0.155}Mn_{0.9}Cu_{0.1}O_3$. The addition of Cu or Co in $La_{0.845}Sr_{0.155}Mn_1O_3$ reduced its ferromagnetism and conductivity. The mechanism of the spin-lattice coupling is discussed.

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