Sound velocity in perovskite manganites La0.67Ca0.33MnO3 with different grain sizes

ABSTRACT

The longitudinal and shear sound velocities in colossal magnetoresistive material La0.67Ca0.33MnO3 sintered at 1100, 1250 and 1350 1C with average grain size 1, 3 and 5 mm, respectively, have been measured from 80 to 300K using the pulse-echo-overlap method.A pronounced increase in the longitudinal sound velocity was observed in all samples around the insulator–metal transition temperature (TIM272 K). XRD patterns showed the orthorhombic structure for all samples. The longitudinal and shear velocities showed the largest hysteresis for the sample with 3 mm grain size. A step-like shear sound velocity anomaly near 120K during cooling or warming was observed to be dependent on the grain size.

Keyword: Sound velocity, Debye temperature, Grain size, Manganites