EFFECT OF PRESSURE ON MAGNETIC PHASE TRANSITIONS AND RELATED VOLUME ANOMALIES OF Ce_2Fe_{17} COMPOUND

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9.7 cm

To get a better insight into the volume dependence of the magnetic properties on Ce_2Fe_{17} compound we performed a.c. susceptibility and thermal expansion studies in temperature range 10 – 320 K and in pressure range up to 10 kbar. At ambient pressure $T_C = 94$ K and $T_N = 206$ K. Our thermal expansion measurements at ambient pressure using the strain gage method showed that both these transitions are connected with remarkable volume anomalies, showing the spontaneous volume magnetostriction $\omega_S \approx 1\%$ at 10 K. The behaviour under pressure is rather complex with giant pressure effect on Curie temperature, $dT_C/dp = -38$ K/kbar, with suppression of ferromagnetic order at 2.5 kbar and moderate pressure effect on Néel temperature, $dT_N/dp = -1.7$ K/kbar. Our compressibility and thermal expansion measurements showed that the T_C volume anomaly is suppressed by the pressure of about 2 kbar and the total spontaneous volume magnetostriction disappears at a pressure of 4 kbar. We ascribe this behaviour to the strong sensitivity of magnetic structures of Ce_2Fe_{17} to interatomic distances.

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