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Effect of Hydrostatic Pressure on Magnetic Caloric Effect of Charge - Orbital Order Perovskite manganite $\mathbf{Pr(Sr_{0.6}Ca_{0.4})_2Mn_2O_7}$ ARUMUGAM S, THIYAGARAJAN R, MOHAN RADHEEP D, ESAKKI MUTHU S, Center for High Pressure Research, School of Physics, Bharathidasan University, Tiruchirappalli 620 024, India, GUOCHU DENG, EKATERINA POMJAKUSHINA, KAZIMIERZ CONDER, Laboratory for Developments and Methods, Paul Scherrer Institute, CH-5232 Villigen, Switzerland, CENTRE FOR HIGH PRESSURE RESEARCH TEAM, PAUL SCHERRER INSTITUTE COLLABORATION — The effect of hydrostatic pressure and magnetic field on magnetic and magnetocaloric properties of half-doped bilayer manganite single crystal $Pr(Sr_{0.6}Ca_{0.4})_2Mn_2O_7$ has been investigated. The sample undergoes an antiferromagnetic (AF) transition at 103 K and a Charge-Orbital ordering (CO) at 179 K under ambient pressure with field of 0.5 T in c-axis. In CO ordered state, magnetization along c-axis shows the hysteresis which represents the first order phase transition and it is enhanced by both H and P. Simultaneously, magnetic caloric effect (ΔS_m) and Relative Cooling Power (RCP) around T_{CO} were increased by the application of the magnetic field and hydrostatic pressure. Although magnitude of ΔS_m is small compared to other conventional ferromagnetic manganites, this study may help to understand the effect of pressure on Magnetic Caloric Effect in antiferromagnetic manganites, especially, bilayer manganites. Further, RCP value gets increased in isothermal magnetization under P. Hence, $Pr(Sr_{0.6}Ca_{0.4})_2Mn_2O_7$ may be a potential candidate for magnetic refrigeration applications.

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