

Giant Electrocaloric Effect in Solid and Soft Materials

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The electrocaloric effect has recently attracted considerable attention due to the prediction of the existence of a giant electrocaloric effect in both novel inorganic and polymeric ferroelectric relaxor systems [1,2]. The giant electrocaloric effect is of great importance for application in cooling or heating devices of new generation, which would be friendlier for environment. Unfortunately, recent predictions of the existence of the giant electrocaloric effect in polymeric and inorganic ferroelectric relaxors [1,2] are based solely on indirect measurements of the electric polarization and not on a direct measurement of the electrocaloric effect itself. A review of recent direct measurements of the giant electrocaloric effect in polymeric and inorganic ferroelectrics will be given. The relevance of the critical point proximity for the enhancement of the giant electrocaloric effect similar to the enhancement of the giant electromechanical response [3] will be discussed.

[1] A.S. Mischenko, Q. Zhang, J.F. Scott, R.W. Whatmore, N.D. Mathur, *Science* 311, 1270 (2006).

[2] B. Neese, B. Chu, S.-G. Lu, Y. Wang, E. Furman, Q. M. Zhang, *Science* vol. 321, 821 (2008).

[3] Z. Kutnjak, J. Petzelt, R. Blinc, *Nature* 441, 956 (2006).