

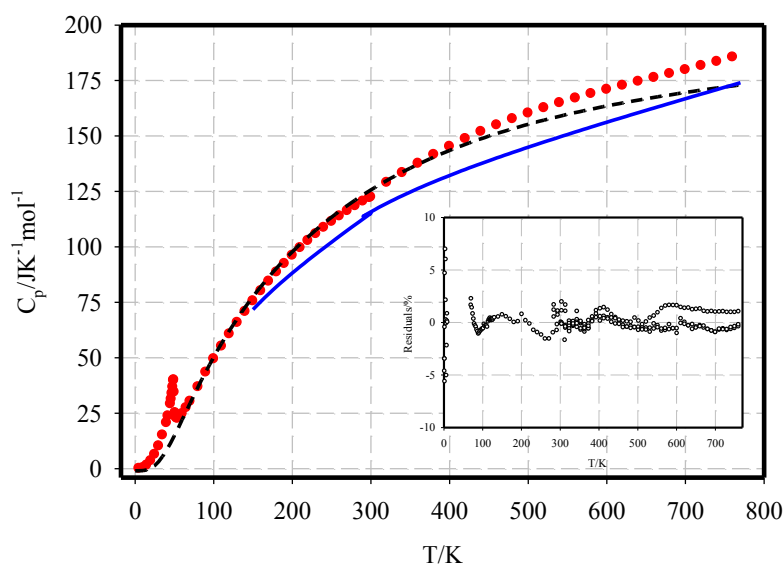
# Heat Capacity ( $C_p$ ) and entropy of olivine-type $\text{LiFePO}_4$ in the temperature range 2 K to 773 K

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The heat capacity of olivine-type lithium iron phosphate ( $\text{LiFePO}_4$  - LFP) has been measured covering a temperature range from 2 K to 773 K. Three different calorimeters were used. The Physical Property Measurement System (PPMS) from Quantum Design was applied in the range between (2 and 300) K, a Micro-DSC II from Setaram within the range between 283 and 353 K and data between 278 K and 773 K were measured by means of a Sensys DSC (Setaram) using the  $C_p$ -by-step method. Experimental data are given with an accuracy of (1 to 2) % above  $T = 20$  K and up to 8% below 20 K. The data were subdivided into four appropriate temperature intervals and fitted using common heat capacity functions. The low temperature results permit the calculation of standard entropies and temperature coefficients of electronic, lattice, as well as magnetic (antiferromagnetic transition at 49.2 K) contributions to the heat capacity. The obtained experimental values were compared to results of a recently published first principles phonon study (DFT) and to few available experimental data from the literature.



**Fig. 1:** Heat capacity of olivine-type lithium iron phosphate at constant pressure (1 bar). The figure shows our experimental heat capacity data between 2 K and 773 K (dots), that are compared to experimental literature data (solid line) covering a smaller temperature range and to data from a first principle DFT-study (dashed line) without considering the magnetic transition near 50 K. The inset indicates the deviation of the experimental data from the fits.