Antiferromagnetic Ordering in Genuine Organic Anion-Radical Salt (N-Me-2,6-di-Me-Pz)$(TCNQ)_2$ at Very Low Temperatures

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The (N-Me-2,6-di-Me-Pz)$(TCNQ)_2$ is a genuine organic anion-radical salt with layered structure consisting of [N-Me-2,6-di-Me-Pz]$^+$ cations and $TCNQ^-$ anions. Cation layers alternate along the c axis with layers consisting of $TCNQ^-$ anion-radicals. It was shown that magnetic and thermodynamic properties of the sample can be described in terms of a spin-ladder model[1]. We performed the measurements of heat capacity and dielectric properties from 2 K down to 50 mK in magnetic fields up to 9 T. We separated the lattice contribution to the total heat capacity and calculated the Debye temperature $\Theta_D \approx 61$ K. The specific heat data of (N-Me-2,6-di-Me-Pz)$(TCNQ)_2$ showed a sharp phase transition at $T_N \approx 90$ mK, indicating the possible onset of long-range order. Both specific heat and dielectric measurements under magnetic field also revealed that this phase transition is not due to charge ordering or structured phase transition but to magnetic ordering.

[1]A. Radváková et al., J. Phys.: Condens. Matter **21**, 175405 (2004).