

Phase Polymorphism of $[\text{Ni}(\text{DMSO})_6](\text{ClO}_4)_2$ Studied by Differential Scanning Calorimetry

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Z. Naturforsch. **62a**, 67 – 74 (2007); received September 18, 2006

Six solid phases of $[\text{Ni}(\text{DMSO})_6](\text{ClO}_4)_2$ have been detected by differential scanning calorimetry (DSC). The five phase transitions were detected between the following solid phases: metastable KIII \leftrightarrow undercooled K0 at $T_{\text{C}5} = 326$ K, stable KIb \rightarrow stable KIa at $T_{\text{C}4} = 350$ K, metastable KII \leftrightarrow undercooled KI at $T_{\text{C}3} = 353$ K, stable KIa \rightarrow stable KI at $T_{\text{C}2} = 365$ K and stable KI \rightarrow stable K0 at $T_{\text{C}1} = 380$ K. At $T_{\text{m}2} = 459$ K the title compound partially dissolves in DMSO, which arises from the decomposition of $[\text{Ni}(\text{DMSO})_6](\text{ClO}_4)_2$ to $[\text{Ni}(\text{DMSO})_5](\text{ClO}_4)_2$, and at $T_{\text{m}1} = 526$ K created in this way a substance which completely melts. From the entropy changes at the melting point and at phase transitions it can be concluded that the phases K0 and undercooled K0 are orientationally dynamically disordered crystals. The stable phases KI, KIa, KIb and the metastable phases KII and KIII are more or less ordered solids.

Key words: Hexadimethylsulphoxidenickel(II) Chlorate(VII); Phase Transitions; Melting Point; DSC.