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Phase Transitions of Hexadecanethiol Self-Assembled Monolayers on Polycrystalline Silver Studied by NanoDSC[1] LIANG HU, LESLIE ALLEN, Department of Materials Science and Engineering, University of Illinois at Urbana-Champaign — Hexadecanethiol self-assembled monolayers (SAMs) grown on polycrystalline Ag planar surfaces (2D) and nanoparticles (3D) are studied by measuring heat capacity with NanoDSC. Two different melting transitions with peak temperature TM1=115°C and TM2=127°C are observed, which indicates two ordered phases exist. SAMs with TM2 are thermodynamically preferred, and the melting characteristics are comparable to that of Ag-Alkanethiolate layered materials precipitated from solution as reported in the literature. Three different states of the system can be obtained by specific heating and cooling schedule: (1) upon fully annealing, a single phase with TM2 is observed; (2) partially annealing results in the coexistence of both phases; (3) upon rapid quenching from high temperature, a single phase with TM1 can be obtained.

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