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Differential AC chip calorimeter for in situ investigation of vapor deposited thin films MATHIAS AHRENBERG, CHRISTOPH SCHICK, HEIKO HUTH, EVGENI SCHOIFET, University of Rostock, MARK EDIGER, KATIE WHITAKER, University of Wisconsin - Madison, Wisconsin, USA — Physical vapor deposition (PVD) can be used to produce thin films with particular material properties like extraordinarily stable glasses of organic molecules. We describe an AC chip calorimeter for in-situ heat capacity measurements of as-deposited nanometer thin films of organic glass formers. The calorimetric system is based on a differential AC chip calorimeter which is placed in the vacuum chamber for physical vapor deposition. The sample is directly deposited onto one calorimetric chip sensor while the other sensor is protected against deposition. The device and the temperature calibration procedure are described. The latter makes use of the phase transitions of cyclopentane and the frequency dependence of the dynamic glass transition of toluene and ethylbenzene. Sample thickness determination is based on a finite element modeling (FEM) of the sensor sample arrangement. A layer of toluene was added to the sample sensor and its thickness was varied in an iterative way until the model fits the experimental data.

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