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Glass transition cooperativity from broad band heat capacity spectroscopy YEONG ZEN CHUA, GUNNAR SCHULZ, EVGENI SHOIFET, HEIKO HUTH, University of Rostock, REINER ZORN, Juelich Centre for Neutron Science, JUERN W.P. SCHMELZER, CHRISTOPH SCHICK, University of Rostock — Molecular dynamics is often studied by broad band dielectric spectroscopy (BDS) because of the wide dynamic range available and the large number of processes resulting in electrical dipole fluctuation and with that in a dielectrically detectable relaxation process. Calorimetry on the other hand is an effective analytical tool to characterize phase and glass transitions by its signatures in heat capacity. In the linear response scheme, heat capacity is considered as entropy compliance. Consequently, only processes significantly contributing to entropy fluctuations appear in calorimetric curves. The glass relaxation is prominent example for such a process. Here we present complex heat capacity at the dynamic glass transition (segmental relaxation) of polystyrene (PS) and poly(methyl methacrylate) (PMMA) in a dynamic range of 11 orders of magnitude, which is comparable to BDS [1]. As one of the results, we determine the temperature dependence of the characteristic length of the corresponding fluctuations. The characteristic length decreases from about 4 nm to about 0.7 nm in the temperature range from 370 K to 500 K. This proves an estimate for possible confinement effects on the segmental relaxation, which is different from vitrification as discussed by Cangialosi *et al.* [2]. [1] Y. Z. Chua *et al.*, Col & Poly Sci **292**, 2014. [2] D. Cangialosi, J of Phys: Cond Matt **26** (15), 2014.

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