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Do Two-Level-Systems and Boson Peak persist or disappear in highly stable glasses? MIGUEL A. RAMOS, TOMAS PEREZ-CASTANEDA, Univ Autonoma de Madrid, RAFAEL JIMENEZ-RIOBOO, Inst Ciencia de Materiales de Madrid, CRISTIAN RODRIGUEZ-TINOCO, JAVIER RODRIGUEZ-VIEJO, Univ Autonoma de Barcelona — We have investigated how deep kinetic and thermodynamic stabilization in glasses can affect their universal properties at low temperatures. In particular, we have studied two different kinds of material which allow us to access highly-stable glassy states, as well as their corresponding conventional glasses: (i) ancient amber, which is a glass which has experienced an extremely long hyperaging process; and (ii) ultrastable thin-film glasses of indomethacin, prepared by physical vapor deposition at temperatures around 85% of its glass-transition temperature. Specifically, we have studied 110-million-year-old amber samples from El Soplao (Spain). Specific heat Cp measurements of pristine and rejuvenated samples were conducted in the temperature range 0.07K <T <30K, as well as around its glass-transition temperature Tg = 150^{o}C. A modest increase of the boson-peak height (in Cp/T^3) with increasing rejuvenation was observed. The amount of two-level systems (TLS) was however found to be exactly the same for the pristine hyperaged amber as for the subsequently rejuvenated samples. On the other hand, we have observed an unexpected suppression of the universal TLS in the ultrastable glass of indomethacin, whereas conventionally prepared thin films of the same material exhibit the usual linear term in Cp below 1 K ascribed to TLS in glasses.

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