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Ultras-stable Physical Vapor Deposited Amorphous Teflon Films with Extreme Fictive Temperature Reduction GREGORY MCKENNA, HEEDONG YOON, YUNG KOH, SINDEE SIMON, Chemical Engineering, Texas Tech University — In the present work, we have produced highly stable amorphous fluoropolymer (Teflon AF® 1600) films to study the calorimetric and relaxation behavior in the deep in the glassy regime. Physical vapor deposition (PVD) was used to produce 110 to 700 nm PVD films with substrate temperature ranging from 0.70 T_g to 0.90 T_g. Fictive temperature (T_f) was measured using Flash DSC with 600 K/s heating and cooling rates. Consistent with prior observations for small molecular weight glasses [J. Chem. Phys. 2007, 127, 154702], large enthalpy overshoots were observed in the stable amorphous Teflon films. The T_f reduction for the stable Teflon films deposited in the vicinity of 0.85 T_g was approximately 70 K compared to the $T_g$of the rejuvenated system. The relaxation behavior of stable Teflon films was measured using the TTU bubble inflation technique and following Struik's protocol in the temperature range from T_f to T_g. The results show that the relaxation time decreases with increasing aging time implying that devitrification is occurring in this regime.

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