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Temperature-equivalent of strain rate for the yield stress of amorphous solids PENGHUI CAO, XI LIN, HAROLD S. PARK, Department of Mechanical Engineering, Boston University — We couple the recently developed self-learning metabasin escape (SLME) algorithm with continuous shear deformations to probe the yield stress as a function of temperature for a binary Lennard-Jones amorphous solid. At room temperature and laboratory strain rates, the activation volume associated with yield is less than 10 atoms, while the yield stress is found to be as sensitive to a 1.5%Tg increase in temperature as it is to a one order of magnitude decrease in strain rate. Our SLME results suggest a transition in yield mechanism for temperatures lower than about 0.54Tg that is not captured by extrapolating high strain rate molecular dynamics simulations to laboratory strain rates.

Penghui Cao
Department of Mechanical Engineering, Boston University

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