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Generalized thermodynamic approach for determining the fictive temperature of glasses with arbitrary thermal history

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We propose a generalized approach to calculate fictive temperature as determined by the thermodynamic state of a glass. The technique is validated both experimentally and numerically using a novel approach for modeling of glass relaxation behavior. We demonstrate that a glassy fictive temperature can be determined at any calorimetric scan rate in excellent agreement with modeled values. The technique is universally applicable to glasses of any thermal history, as proved through a series of numerical simulations where the fictive temperature is precisely known within the model.