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Odd-even Effects of Glass Transition Temperature with a Network-forming Ionic Glass[1] KE YANG, Department of Materials Science and Engineering, University of Illinois at Urbana-Champaign, MADHUSUDAN TYAGI, 3NIST Center for Neutron Research, National Institute for Standards and Technology, JEFFREY MOORE, Department of Chemistry, University of Illinois at Urbana-Champaign, YANG ZHANG, Department of Nuclear, Plasma, and Radiological Engineering, University of Illinois at Urbana-Champaign — Odd-even effects, the non-monotonic dependency of physical properties on odd/even structural units, are widely observed in homologous series of crystalline materials. However, such alternation is not expected for molecular amorphous materials. Herein, we report the synthesis of a class of network-forming ionic glasses (IG) using non-spherical multivalent ammonium cations and citrate anions. The glass transition temperatures of these amorphous solids show an alternating pattern with increasing backbone length. To understand the phenomenon's molecular origin, we performed incoherent elastic neutron scattering measurements of the nanosecond atomic dynamics. In addition, quasi-elastic neutron scattering measurements were performed to measure two very discrete relaxation process in this ionic glass. Our results suggest that the molecules' mobility, thus the glass transition temperature, correlates with their structural symmetry.

[1]a Neutron Scattering Study

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