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Imparting large macroscopic changes with small changes in polypeptide composition MICHELLE SING, GARETH MCKINLEY, BRADLEY OLSEN, Massachusetts Institute of Technology — Block copolymers composed of polypeptides provide an excellent platform for exploring the underlying physics surrounding macroscopic associative network behavior. Previous work in our group has elucidated a difference in the mechanical properties of two nearly identical elastin-like polypeptide (ELP) endblocks. In poly(ELP)s, this substitution is known to result in tighter beta turns. These beta turns exhibit slower responses to changes in temperature within the material. Under shear, the modulus for the alanine-containing ELP triblock is almost three times higher than the glycine-containing ELP. Additionally, preliminary tensile tests show higher stress and strain at break for the alanine ELP triblock. We are able to explain the reasons for this behavior using a variety of spectroscopic and analytical techniques. Small angle neutron and x-ray scattering indicate differences in ordering between the alanine and glycine containing ELP materials both in shear and in stagnant flow.

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