1161-82-121 **Michael Lang*** (lang@ipfdd.de), Leibniz Institut für Polymerforschung, Dresden, Hohe Straße 6, 01069 Dresden, Germany, and **Jakob Fischer**, **Ron Dockhorn**, **Benjamin Köhler**, **Marco Werner** and **Jens-Uwe Sommer**. *Olympic Gels.*

We use large scale computer simulations to create topologically linked gels, so-called "Olympic gels". We discuss briefly several different options to prepare these gels either using cyclic DNA and topoisomerase, a multi-batch ring-chain equilibrium - also called "DNA-Origami", a progressive construction method, or a reversible ring-opening polymerization at extremely low reaction rates. The structure of the gels is analyzed based upon a distribution of pairwise linkages that we determine using the HOMFLY polynomial. We also report briefly on the physical properties of Olympic gels regarding deformation behavior and swelling. These properties are rather unique, as the initial regime of both deformation and swelling costs almost no conformational entropy. (Received August 14, 2020)