Creep experiments on organic polycrystals as a rock analogue

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We investigated mechanical properties of the polycrystalline materials, especially of their creep behavior; since it appears at various geological phenomena with a large time scale such as mantle convection and post-glacical rebound, etc.

It is difficult to deform mineral aggregates without fracturing at room experiment; therefore, in this study, we used borneol(C10O18H) polycrystal as a rock analogue. We made the polycrystalline borneol column of 3 cm in the diameter with ˜5cm in height, and compressed it under a constant temperature and displacement speed. We applied several strain rate of 0.002-0.02(mm/min), and measured the stress during its deformation. We found the strain rate is related to 5th power of the stress. Intense grain growth should have occurred during the experiment; however, the flow stress is independent on time. These results support that the material deformed via dislocation creep.