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Shape Fixity and Shape Recovery of Shape Memory Polymer and their Applications

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The thermomechanical properties of polyurethane-shape memory polymer (SMP) foams are investigated experimentally and applications of SMP are introduced. The results obtained can be summarized as follows. (1) By cooling the foam after compressive deformation at high temperature, stress decreases and the deformed shape is fixed. By heating the shape-fixed foam under no-load, the original shape is recovered. The ratio of shape fixity is 100% and that of shape recovery 98%. (2) Recovery stres increases by heating under constraint of the fixed shape. Recovery stress is about 80% of the applied stress. (3) The shape deformed at high temperature is maintained for six months under no-load at Tg-60K without depending on maximum strain, and the original shape is recovered by heating thereafter. (4) If the deformed shape is kept at high temperature, secondary-shape forming appears. (5) Main properties of SMP and their applications are summarized.

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