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Squishy Materials

Most people do not realize that many substances they use in the kitchen and the bathroom are not simple liquids or solids. Everyone is familiar with three states of matter: solids, liquids, and gases. However, creams, shampoo, toothpaste, and ketchup all have properties of both liquids and solids. (...) squishy substances, defined as materials that are not unambiguously solid, liquid, or gas. (...)

The unique properties of squishy materials are best understood by comparison with those of regular liquids, specifically viscosity and density (...).

Squishy materials typically do not have a well-defined viscosity. (...)

Fig. 1. A cornstarch-water mixture can be rolled around in your hand like a ball of soft clay (left), but will then flow like a liquid when you cease rolling it (right)

Shear-Thickening Liquids: These have a low apparent viscosity when mixed slowly, but the viscosity grows dramatically when mixed quickly – in other words, the liquid "thickens" when shear is increased. Cornstarch is perhaps the most dramatic example: A mixture of ~50% by weight mixed with water can be rolled around in your hand like a ball of soft clay but will then flow like a liquid when you cease rolling it (Fig. 1). This is a good demonstration of a material with both liquid-like and solid-like properties under different circumstances.

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