



Super absorbent polymers can absorb and retain liquids in a variety of applications, including baby diapers and potting soil. A common type of SAP, known commercially as "Instant Snow", is a white powder that can absorb hundreds of times its weight in water. In this way, it expands and hardens into white fluff, which looks and feels very similar to snow.

### **Instant Snow**

The most commonly used SAP in disposable diapers is a polymer composed of repeating sodium polyacrylate monomers ( $C_3H_3NaO_2$ ), with thousands of chains connected together, perhaps millions of monomers long. Then, the chain is cross-linked from one position in the chain to another by additional chemical bonds until it resembles a very tangled and knotted string ball .

This material is usually sold as a white powder. After absorbing the liquid, it turns into a gel, which makes it an effective fixative for baby by-products. Sodium polyacrylate has been proven to absorb 800 times its own weight in distilled water. Unfortunately, the presence of salt or other impurities in the water will reduce the absorption rate, making it less effective in the wild.

Different polymers of sodium polyacrylate can be produced by increasing or decreasing the

density of crosslinks. Under a certain range of crosslink density, the polymer changes behavior. It will not become a gel after absorbing water, but will swell and harden into white fluff, similar to snow. This version of sodium polyacrylate is often referred to as "Instant Snow".

### **How instant snow works**

After sodium polyacrylate has absorbed water, it can be returned to its original powder form simply by leaving it out to dry for several days. The water will slowly evaporate. Heating it may accelerate the drying process but it may also alter the cross-linking of the polymer, and thereby change the performance of the material. Suppliers of instant snow recommend spreading it in a thin layer and leaving it in a dry place for 7 to 10 days.