



History of Super Absorbent Polymer Chemistry

Super Absorbent Polymer (Hereinafter referred to as SAP) is a new type of functional polymer material. As an absorbency material, it can absorb hundreds to thousands of times its weight and become water-swelling Hydrogel.

Hydrogels have the ability to keep water even if under the pressure. It is so different from the other traditional water-absorbing material such as tissue paper, cotton, sponge, and fluff pulp. So, what is the history of SAP?



In the 1980s, water-absorbing materials were tissue paper, cotton, sponge, and fluff pulp. The water retention capacity of these materials is only 20 times their weight – at most.

In the 1960s, the United States Department of Agriculture started to work on materials to improve water conservation in soils. They developed a resin bas



on the grafting of acrylonitrile polymer onto the backbone of starch molecules. This new absorbency material can absorb more than 400 times its weight. The most important thing is, the gel did not release liquid water even under pressure!

As Japanese companies were excluded by the USDA, they started independent research using starch, carboxymethylcellulose (CMC), acrylic acid, polyvinyl alcohol (PVA), and isobutylene maleic anhydride (IMA).

In the 1970s, SAP was used commercially for the first time -for disposable hygienic products (not for soil amendment applications as originally intended).

SAP was first used in Europe in a baby diaper in 1982. Shortly thereafter, UniCharm introduced super absorbent baby diapers in Japan.

Over the years, technology has progressed so that there is little if any starch-grafted super absorbent polymer used in disposable hygienic products. These super absorbents typically are cross-linked acrylic homopolymers (usually Sodium neutralized).

Superabsorbents used in soil amendments applications tend to be cross-linked acrylic-acrylamide co-polymers (usually Potassium neutralized).

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