

Polymer gels: fundamental properties and their dynamics

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This lecture explores the fundamentals and advancements of polymer gels—crosslinked polymer networks that absorb and retain a significant amount of solvent.

Key topics include polymer network formation, swelling behavior, mechanical properties, and advanced architectural design of the network(s), including tough double-network gels.

A particular focus will be on mechanically induced dynamism in the gels. Upon application of a mechanical stimulus, these gels undergo structural transformations or chemical reactions, resulting in enhanced toughness and functionality.

By the end, learners will understand the design principles of a long-lasting, adaptive, and highly crack-resistant gel for a sustainable society.