

Statistical mechanics of reversible, self-organized networks

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We will review the rheology of reversible, self-organized networks using a statistical mechanics perspective, where the linear and nonlinear response of this type of materials emerge from the microscopic components, their spatial organization, and their dynamics.

Aspects discussed will include rigidity, elasticity, and network topology, as fundamental ingredients to understand the mechanical behaviors, such as viscoelastic response, yielding, toughness and plasticity.

When multi-component networks are considered, the spatial organization of the different components may significantly change, also depending on the inter-component interactions, and change dramatically the response of the composite material.

We will discuss how network architectures can lead to distinct mechanical responses.