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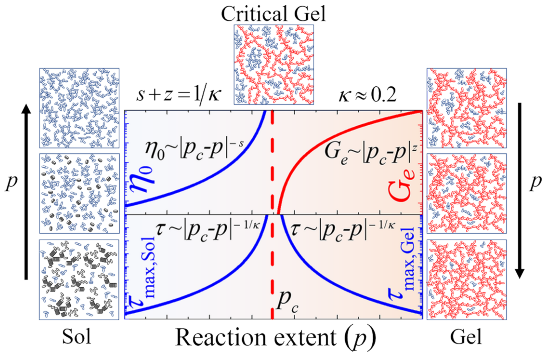
**Measurements of two gel forming systems allowed experimental verification of theoretically proposed scaling laws for the sol-gel transition.**




Many industrial materials and foodstuffs use the sol-gel transition, which converts a colloidal solution into a gel. This process is a critical phenomenon, meaning the system should exhibit universal scaling behavior when near the gel point. While the sol-gel transition has been studied for decades, researchers have not experimentally validated all the scaling laws for a sol-gel transition system until now.

Khushboo Suman and Yogesh Joshi experimentally validated all of the theoretically proposed scaling laws and hyperscaling laws of the sol-gel transition. They took rheological measurements of two gel-forming systems with different microstructures: a colloidal gel and a molecular gel. All of the obtained critical exponents obeyed scaling and hyperscaling laws, confirming the universality of the laws for gel-forming systems.

The authors also found that the two gel-forming systems obey scaling laws under both isothermal and non-isothermal environments.

Validation of hyperscaling laws, which define the relationships between the different scaling exponents, led the authors to suggest that knowing any two scaling exponents for a gel-forming system will provide all of the other scaling exponents of the system. These scaling exponents can then be used to describe the rheological properties of materials during the sol-gel transition without conducting multiple experiments.

“This is very useful information that can be applied to any system undergoing sol-gel transition,” said Joshi.

Additionally, the authors observed that the relaxation time diverged symmetrically from either side of the critical gel state for both gel-forming systems. Next, the authors plan to explore why relaxation time diverges symmetrically near the gel point, as well as more unanswered questions about scaling laws.

**Source:** “On the universality of the scaling relations during sol-gel transition,” by Khushboo Suman and Yogesh M. Joshi, *Journal of Rheology* (2020). The article can be accessed at https://doi.org/10.1122/1.5134115.