

Understanding Polymer-Colloid Gels: A Solvent Perspective Using Low-Field NMR

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Mots-clés : Hydrogels, RMN, Rheology, Polysaccharides, Nanocomposites

Résumé :

We emphasize the relevance of low-field NMR relaxometry to investigate colloid-polymer (carbon black – carboxymethylcellulose) hydrogels by probing water dynamics across a wide range of formulations between 10°C and 80°C. By examining the temperature dependence of the transverse relaxation time T_2 , we demonstrate a clear link between the NMR response and the rheological behavior of the hydrogels (Fig. 1). In particular, we show that NMR relaxometry targeting the solvent provides reliable insights into the hydrogel microstructure and allows the detection of phase transitions and aging processes. Our findings suggest that this solvent-focused technique could greatly benefit the soft matter community, complementing other experimental methods in the study of gels. [1]

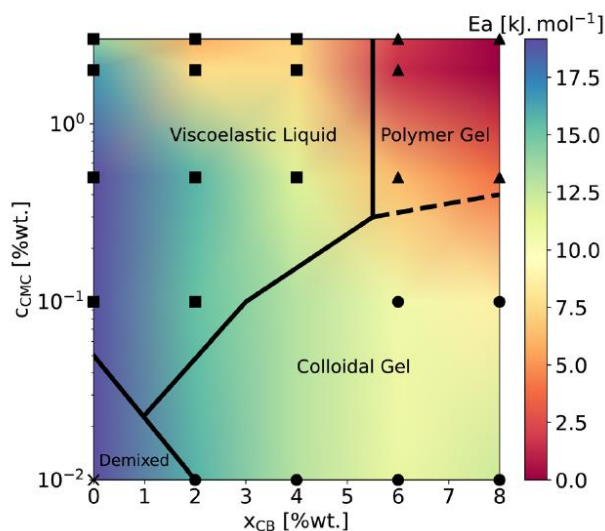


Fig.1: Phase diagram of hybrid hydrogels made of carboxymethylcellulose (CMC) and carbon black (CB) unifying the rheological behavior and the activation energy extracted from low-field NMR T_2 measurements.

Références :

[1] : L. Hervéou ; G. Legrand ; T. Divoux and G.P. Baeza, *Soft Matter*, 2025, **21**, 342-347