

## Impact of polymorphism in organogels

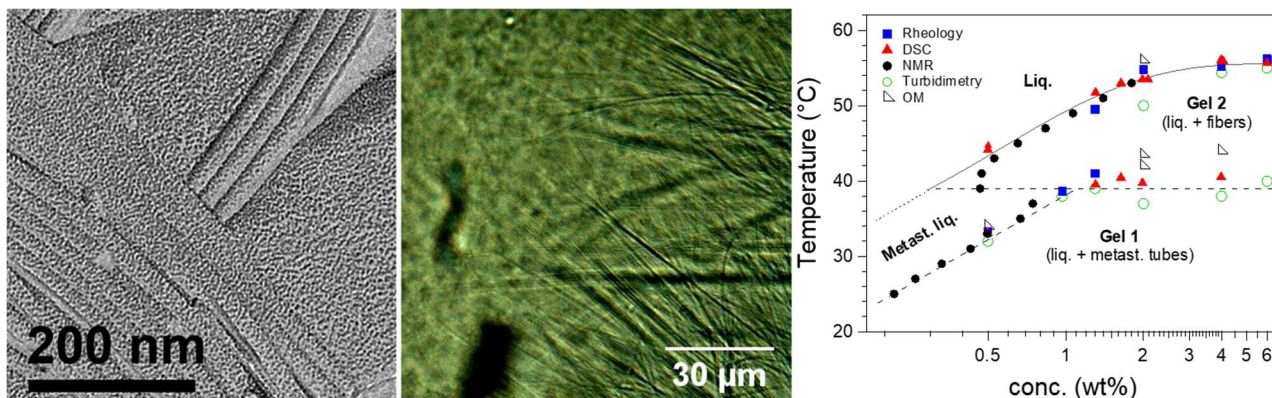
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**ABSTRACT:** Low molecular weight gelators, molecules able to gel organic solvents, now constitute a recognized field of research.<sup>1</sup> Much work has been achieved, mainly to develop new organogelators, underpinned by their potential applications in different fields such as biomedical field or organic electronics. Despite this work, many fundamental aspects remain poorly understood, especially in the thermodynamics of gelation and its mechanism. For instance, the structure of the gels depends on supersaturation or cooling rate,<sup>2,3</sup> but only few quantitative studies have been conducted.<sup>4</sup> As shown very recently, some organogels can exhibit gel-to-gel transitions,<sup>5</sup> showing a polymorphism in organogels. Although in these examples the

phase diagrams were not mapped, they must be impacted by these transitions and should appear more complex than commonly granted with only two domains: the sol and gel phase.

In this paper, we report the formation of self-assembled nanotubes by HUB-4, a simple mono-amide. We show its conversion into another crystalline morph. We have studied the structure of both polymorphs by TEM, SAXS, WAXS and FTIR. We have mapped the phase diagrams for both morphs by rheology, VT-NMR, turbidimetry, OM and microDSC. The relative stability of both morphs was established, along with the conditions to form them (ageing or annealing). The impact of the transitions or conditions of formations on the mechanical properties of the corresponding gels is also shown.<sup>6</sup>



**Figure:** *Left* : Cryofracture TEM of a gel of HUB-4 in  $C_6H_{12}$  short after its formation. *Middle* : OM of HUB-4/ trans-decalin (2 wt. %) at 43.5 °C showing the transition between a gel made of nanotubes (speckled area) and thick fibers. *Right* : c-T Phase diagram of HUB-4/trans-Decalin.

**KEY WORDS:** Organogels, polymorphism, phase diagrams.

## References

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