

## **Supercritical carbon dioxide as an efficient solvent for the manufacture of specialty organoclays: from lab preparation to pre-industrial production**

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Although the nanoclay particles market is continuously growing, the difficulty to disperse them in specialty polymers remains a major restraint. In order to increase the compatibility between fillers and matrices, the variety of clay organomodifiers has to be extended, in particular to non-water soluble surfactants.

In this context, our team has developed the use of supercritical carbon dioxide (scCO<sub>2</sub>) as solvent for the organomodification of clays. Indeed, scCO<sub>2</sub> has excellent transport properties and solubilises a large number of surfactants, among which fluorinated and siliconated surfactants. The process is simple, environmentally friendly and easy to transfer to the industrial scale. Indeed, typical experimental conditions are a temperature of 40°C and a pressure of 100 bar for 2 hours. After reaction and depressurization, dried clays are directly obtained. Using this process, three types of organoclays were prepared: fluorinated nanoclays, siliconated nanoclays and high temperature stable nanoclays (up to 260°C). Their production has been scaled up to kilograms thanks to our lab's pilot plant, while their dispersion in specialty polymers is studied in collaboration with industrial partners. Finally, these organoclays are commercialized through the spin-off FINECLAY.