Supporting Information for:

Bowls, Vases and Goblets – The Microcrockery of Polymer and Nanocomposite Morphology Revealed by Two-Photon Optical Tomography

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Figure S1a shows a transmission electron microscope (TEM) image of the 200 nm diameter silica nanoparticles used. **Figure S1b** shows that a NR molecule contained a siloxane head group is chemically bound to the NP. **Figure S1c** is the histogram of NP size measured from TEM images. It shows that the NPs are highly monodisperse.

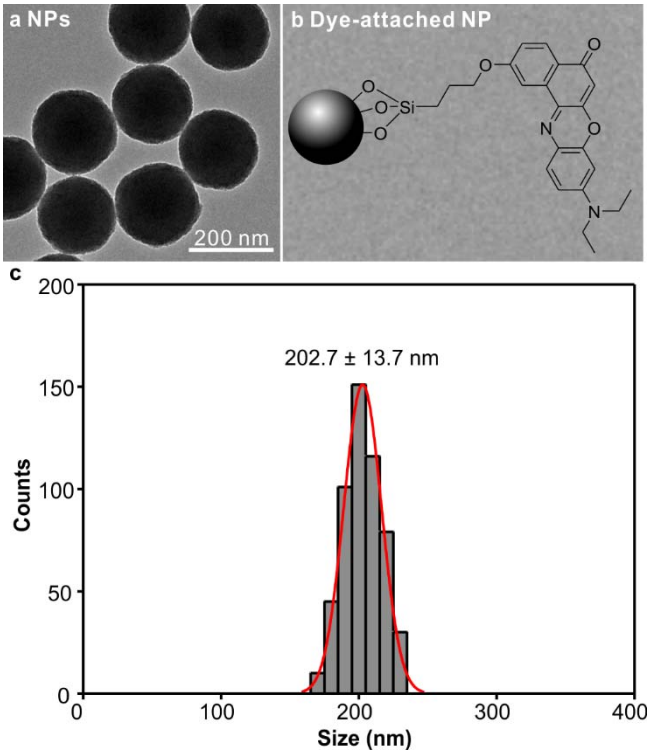

Fig. S1 a, TEM image of SiO_2 NPs of 200 nm diameter. **b**, Siloxane-modified NR molecule chemically bonded to a SiO_2 NP. **c**, Size distribution of the NPs.

To find the suitable immersion time for labelling iPP sample with NR, different immersion times were explored. **Figures S2a** and **S2b** show the examples of under- (14 hours) and over-immersion (65 hours).

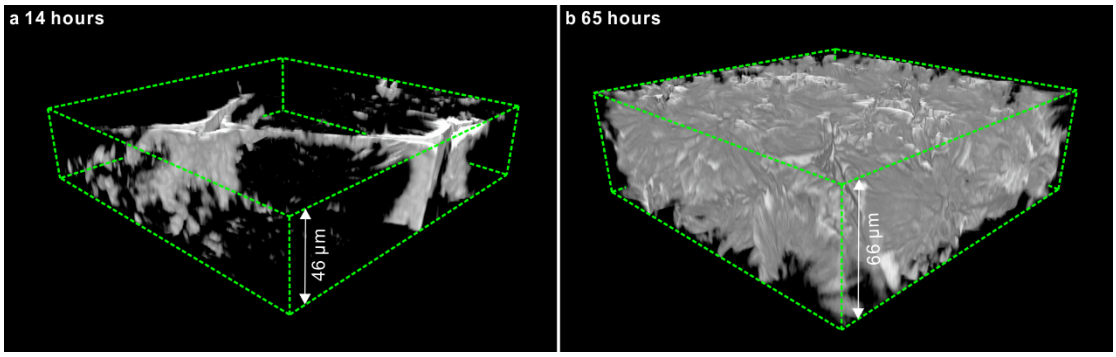

Fig. S2 "Porous" 3D rendering of iPP sample labelled by infiltration of the NR solution, **a**, under-immersion 14 hours, **b**, over-immersion 65 hours.

Figure S3 shows that, as in PLA, the aspect ratio of iPP spherulites also increases with the proximity of the substrate, but to a lesser extent.

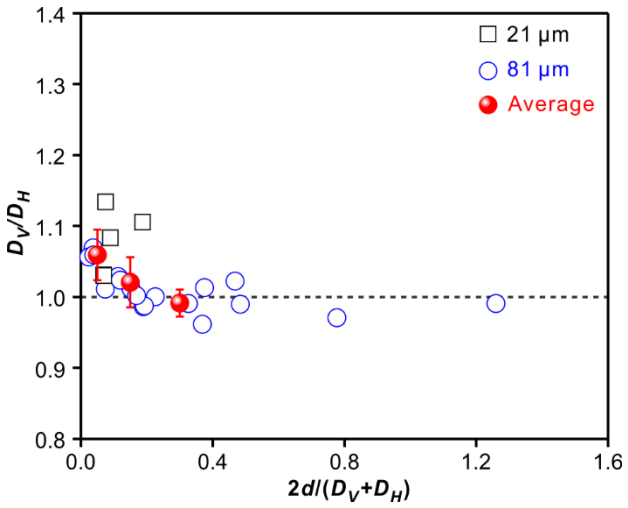

Fig. S3 Aspect ratio of growth-arrested iPP spherulites as a function of relative distance from the glass surface (*cf.* Fig 6e).