

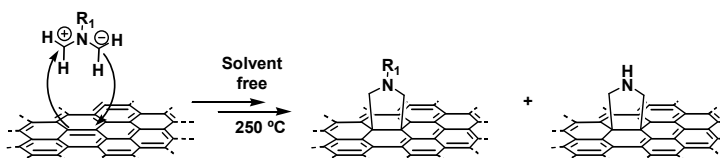
Microinjection moulding of polyamide with functionalized carbon nanotubes

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Chemical modification of carbon nanotubes is an approach used to overcome the problem of dispersion and interfacial bonding with different materials. In this work, the nanotubes were functionalized using the 1,3-dipolar cycloaddition reaction, that generate pyrrolidine groups on the nanotubes surface, as summarized in the following scheme.



The nanotubes were mixed with polyamide 6 in a prototype mini-twin screw extruder. The composite was injection moulded into small specimens (Figure a) using a microinjection moulding machine Boy 12. The nanotube agglomerate size and distribution was measured, as well as the electrical and mechanical properties. The functionalized nanotubes presented a better interface with the matrix polymer compared to non-modified nanotubes, as depicted in Figure b and c.

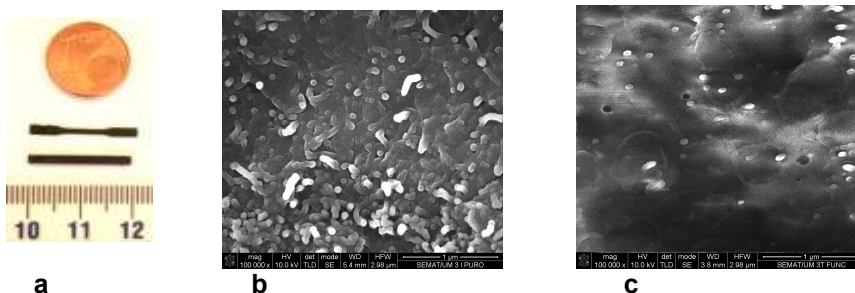


Figure: a) injection moulded composite specimens and: scanning electron micrographs of b) cross-section of the composite formed with 3 wt% non-functionalized CNT, c) cross-section of the composite formed with 3 wt% functionalized CNT.

References

Araújo, R. F., Paiva, M. C., Proença, M. F., Silva, C. J. R. *Comp. Sci. Technol.* 2007, **67**, 806–810

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