Chemical functionalization of carbon nanomaterials for magnetic drug delivery applications

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Carbon nanomaterials have attracted major interest, due to their unique mechanical and electrical properties, for drug delivery applications. In particular, CNTs offer the ability to chemically functionalize their surface, by covalent or non covalent bonding approaches between CNTs and other materials of interest. In this context, iron nanoparticles originated from magnetite (Fe_3O_4), were attached on the multi-walled carbon nanotube's (MWCNTs) outer core, aiming to form a magnetically controlled nano-platform. [1] The nanoparticles dispersion and binding yield were also studied, so as to achieve an homogeneous distribution of iron nanoparticles across the nanotube surface and minimize their aggregation in larger agglomerates, which could lead to the formation of thrombus, thus blocking the blood flow. In a later stage, the nano-platform will be also equipped with antibodies for the identification of surface proteins expressed in tumour sites, fluorescent molecules for visualization and chemotherapeutic drugs.

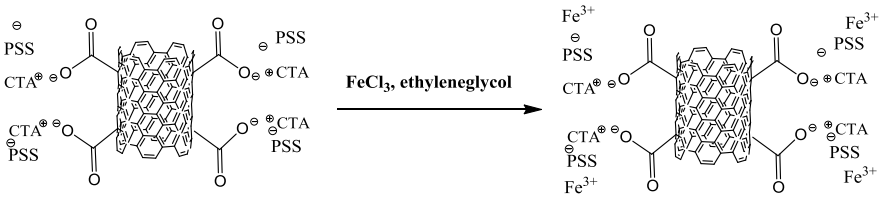

Figure 1: Last step of the CNTs functionalization approach with iron nanoparticles.

References

[1] M. Lewin, et al., *Nature Biotechnology,* **4**, pp. 410-414, (2010).

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