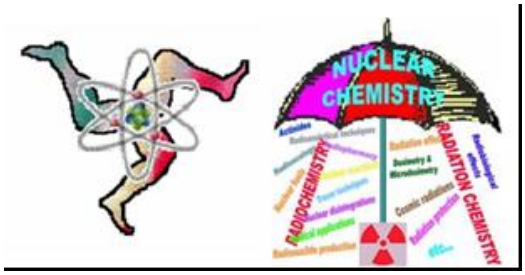

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Radiolabelling of nanoparticles for life-cycle studies

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An increasing number of products containing engineered nanoparticles (NP) raises the question of potential impacts of the applied NP on the environment. During production, application and final disposal, NP-containing products undergo multiple physical (e.g. abrasion) and chemical (e.g. weathering) processes, that potentially influence and alter the availability and mobility of NP. Crucial factors for the fate of NP in the environment are the degree of particle release from materials as well as the degradability/modification and transport behavior. The investigation of these processes requires experimental tools for extremely sensitive particle tracking.
Radiolabelling of NP enables a highly sensitive detection in on-line and in-situ experiments and allows to distinguish sub-processes within complex interactions. It is essential for the application of radiolabelled NP in experimental studies that the radiolabelling process does not alter particle properties and that the radioactive labelling remains stable within the chemical milieu of the experimental setup. Therefore, the use of radioactive basic material for NP-synthesis might be the most appropriate radiolabelling method. However, in some cases the investigation of commercially available NP is required to represent the original properties of the materials used in industrial products.
This study presents a method for the radiolabelling of Ag0-NP and TiO2-NP. The radiolabelling was done with 110mAg and 44Ti/45Ti, respectively. Labelling yields, stability tests and comparative NP-characterization are presented.

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