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A target system for ion-beam activation of particulate nanomaterials

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The application range of manufactured nanomaterials is steadily increasing, as is their use in industry and consumer products. In parallel, there is growing concern about the safety of these materials. Radiolabelling techniques are extremely sensitive and useful tools for tracing studies to assess the fate of nanoparticles and possible risks for human health and environment arising from the large scale industrial application of nanotechnologies.

At the Joint Research Centre's Cyclotron laboratory in Ispra several types of industrially produced nanoparticles have been successfully radiolabelled by proton bombardment and recoil implantation. The particle properties were compared before and after irradiation to investigate the consequences of the radiolabelling process since enhanced aggregation or agglomeration of nanoparticles may easily result from overheating. Particular care has been devoted to the design of a target system able to mitigate the effect of the temperature increase and of the generally low thermal conductivity. To study the temperature profile within the irradiation capsule, a simple simulation model has been compared with experimental results on nanoparticulate.

Please indicate preferred presentation (poster or talk?)

Oral presentation

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