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Microparticle Production as Reference Materials for Particle Analysis Methods in Safeguards

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The application of safeguards measures by the International Atomic Energy Agency (IAEA) involves analytical measurements of samples taken during inspections and requires the development and advancement of analytical techniques. For quality control purposes, the IAEA has expressed the need to acquire reference materials for particle analysis methods applied in safeguards.

To this purpose, a particle production facility was implemented at Forschungszentrum Jülich, which is capable of producing microparticles intended as source material for certified reference materials for particle analysis methods applied in safeguards. A monodisperse particle size distribution as well as the single phase triuranium octoxide structure was confirmed using SEM and μ -XRD/XANES, respectively. Analysis performed on single uranium microparticles confirmed consistency of the uranium isotopic ratios in comparison to the initial precursor solutions. To improve the homogeneity and particle handling, the particles are transferred into suspensions, for which the stability was investigated with respect to dissolution and isotopic exchange.

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