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## **Establishing production and provision of microparticle reference materials for particle analysis through collaboration**

Safeguards measures of the International Atomic Energy Agency (IAEA) include, inter alia, analytical measurements of swipe samples taken during inspections at nuclear facilities. While the use of analytical measurements by the IAEA and its Network of Analytical Laboratories (NWAL) requires constant quality control and further advancement of highly sensitive analytical methods, the demand for tailor-made reference materials for the analysis of uranium isotope signatures in (single) particles is growing.

For this purpose, a trilateral cooperation between IAEA-SGAS, the Joint Research Center in Geel (JRC-Geel) and Forschungszentrum Jülich (Jülich) was established. The overall aim of the cooperation is to qualify Forschungszentrum Jülich as laboratory for the provision of reference materials under the IAEA's NWAL. One essential milestone in the qualification process was the development and implementation of a reliable procedure for producing microparticles. In meeting all IAEA's requirements, the procedure established in Jülich in the past six years produces samples that consist of microparticles with well-defined properties such as monodisperse particle size distribution and consistent isotopic composition. The role of the JRC-Geel in the cooperation is twofold: First, JRC-Geel prepares and certifies the uranium nitrate base solutions taking into account the specifications provided by the IAEA's NWAL. The isotopic compositions of the base solutions are first verified by IAEA-SGAS and then used at Jülich to produce the microparticles. Second, samples prepared by the Jülich procedure are certified for the uranium content and isotopic composition by JRC-Geel. In the current qualification process, samples of microparticles recently produced by Jülich will be used as certified test samples in the up-coming NUSIMEP-9 interlaboratory comparison exercise, prior to the certification as reference materials.

The qualification of Forschungszentrum Jülich as NWAL member is expected to be completed by the end of 2018. Future joint research activities will focus on the production and characterisation of microparticles with defined mixed elemental compositions, such as  $Ln/U$ ,  $Th/U$  and  $Pu/U$  microparticles with respect to the IAEA's requirements and the need of NWAL partners.

### **Which "Key Question" does your Abstract address?**

SGI4.4

### **Which alternative "Key Question" does your Abstract address? (if any)**

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### **Topics**

SGI4

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