Reference materials for nuclear safeguards, safety and security

Nuclear safety, security and non-proliferation are absolute priorities for the EU, supporting the international initiative on a holistic Safety, Security and Safeguards (“3S”) concept for nuclear energy. The European Commission as guardian of the Treaties operates as an effective regional nuclear safeguard system (EURATOM [1]) in close partnership with the International Atomic Energy Agency (IAEA) [2]. Verification and detection in safeguarding nuclear material, conformity of information on materials and processes in nuclear forensics, as well as response in nuclear security are based on reliable measurement results with appropriate quality control tools as prerequisite.

Measurements for nuclear material accounting and control need reference materials as the foundation of the measurement processes. The JRC is an accredited reference material provider specialised in isotopic reference materials. It has, for instance, developed dried spikes for the EURATOM on-site laboratories and a method to prepare uranium fluoride gas samples with specified isotopic compositions. A complete set of uranium and plutonium isotopic reference materials are available for fissile material control at the back end (reprocessing) as well as the front end (enrichment) of the nuclear fuel cycle.

Emphasis is given to the development of new nuclear material measurement standards and conformity assessment tools supporting the technical convergence of nuclear safeguards, nuclear forensics and nuclear security as part of the “3S” concept. The challenge is to develop new isotopic reference materials and quality control materials that resemble real samples supporting the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and the model additional protocol (INFCIRC/540). Particular research and development is carried out at the JRC towards well-characterised isotopic bulk and particle reference materials for environmental sample analysis and for dating of nuclear material in nuclear forensics applications.

More information

Reference materials database and online order catalogue [3]


Links