

NORM & Environmental Radioactivity (Wednesday, February 12, 2014 16:30)

## **A New European COST Network 'NORM4Building' (TU1301) for the Reuse of NORM Containing Residues in Building Materials**

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### **BACKGROUND**

The depletion of energy resources and raw materials demands introduction of sustainability in construction sector and construction material production. In the development of new synthetic building materials the reuse of residue streams becomes a necessity.

A specific class of residues, for which building materials offer an interesting reuse option, originates from NORM (naturally occurring radioactive materials) processing industries. Existing NORM residues being studied for reuse in are among others: (i) coal fly-ash, slag and bottom ash from coal-fired power plants, (ii) phosphorous slag from thermal phosphorus production, (iii) phosphogypsum from phosphoric acid production, (iv) red-mud from alumina production, (v) unprocessed slag from primary iron production and steel or stainless steel, lead, copper and tin slags from primary and secondary production.

Current innovations in the building industry, such as the emerging field of Alkali-Activated Materials<sup>(1-4)</sup>, can open up promising new reuse pathways for these NORM residues in building materials.

Using NORM residues in the production of new types of building materials raises concerns among authorities, public and scientists on the potential gamma exposure from building materials to occupants and on indoor air quality.

The draft of the new Euratom Basic Safety Standards directive (EU-BSS)<sup>(5)</sup>, expected in December 2013, specifically addresses the topic of NORM in building materials and sets the requirement of a radiological screening and further characterisation of building materials before they can be distributed on the market.

### **OBJECTIVES 'NORM4BUILDING' network:**

The new EU sponsored COST action 'NORM4BUILDING' stimulates the collaboration of scientists, industries and regulators. The goal is to gather knowledge, experiences and technologies, to stimulate research on the reuse of residues containing enhanced concentrations of natural radionuclides, originating from NORM processing industries, in tailor-made building materials in the construction sector while considering the impact on both external gamma exposure of building occupants and indoor air quality.

By improving radiological impact assessment models<sup>(6)</sup> for the reuse of NORM residues in building materials the COST Action aims to further stimulate justified uses of NORM residues in different types of newly developed building materials. Based on these models, the Action aims at investigating realistic legislative scenarios so that the authorities concerned can allow reuse pathways for NORM that can be accepted from a radioprotection and chemical point of view in concordance with the Lead Marked Initiative (LMI) and sustainable construction.

The focus of the NORM4BUILDING network is on NORM based building materials that are under research for the production of ceramics, cement, concrete, and in particular Alkali-Activated Materials.

## **PRACTICAL ASPECTS:**

The new COST action was initiated on the 1<sup>st</sup> of January 2014 and runs for four years. COST is supported by the EU RTD Framework Program. In the presentation more information on how to participate in the network will be provided.

In the presentation the new approach and new initiatives of the NORM4BUILDING network, that has its first meeting here in the DEAD SEA Hotel on the 12-13/02/2014, will be introduced.

The NORM4Building materials network will be an open network of researchers. An Advisory Board consisting mainly from NORM processing and construction industries and relevant associations and regulators are invited to work in collaboration with the scientists that will populate the various working groups and the management committee of the new COST action.

## **REFERENCES**

1. Bakharev, T., *Durability of geopolymer materials in sodium and magnesium sulfate solutions*, Cem. Concr. Res., 35 (6), p 1233-1246 (2005)
2. Davidovits, J., *Geopolymers - inorganic polymeric new materials*, J. Therm. Anal., 37 (8), 1633–1656 (1991)
3. Duxson, P., Provis, J.L., Lukey, G.C., van Deventer, J.S.J., *The role of inorganic polymer technology in the development of 'Green concrete'*, Cement and Concrete Research., 37 (12), 1590-1597 (2007)
4. Duxson, P., Fernández-Jiménez, A., Provis, J.L., Lukey, G.C., Palomo, A., van Deventer, J.S.J., *Geopolymer technology: The current state of the art*, J. Mater. Sci., 42 (9), 2917-2933 (2007)
5. EC (European Commission) is currently in the process of recasting five Council Directives: Basic Safety Standards Directive (96/29/Euratom); Medical Directive (97/43/Euratom); Directive on High Activity Sealed Sources (2003/122/Euratom); Directive on Outside Workers (90/641/Euratom); Directive on Public Information (89/618/Euratom) (2013)
6. Risica, S., Bolzan, C., Nuccetelli, C., *Radioactivity in building materials: room model analysis and experimental methods*, Sci. Tot. Environ., 272, 119-26 (2001)