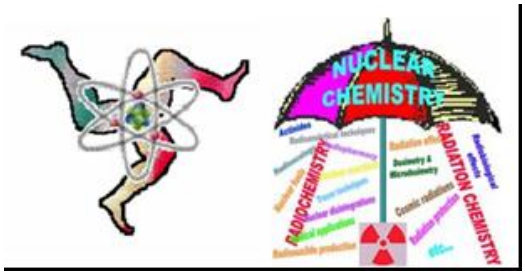

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Sampling/detecting airborne radionuclides and/or nanoparticles

Four passive sampling elements (termed quatrefoil) have been recently developed, which transform volume-distributed radionuclides (Bq/m3) into surface-distributed radionuclides (Bq/cm2). For what concerns airborne particles, these elements exploit the mechanisms of surface-deposition for the selective sampling of particles with nanometer- and micrometer-sizes respectively. In the case of gases, the sampling occurs by trapping the nanometer particles formed by the gas-atoms and/or gas-molecules into the nanoholes of technological advanced materials.

Once exposed, these samplers result in thin radiation sources which can be detected with any real-time or passive detector. While these 4 samplers are in principle useful for all types of airborne radionuclides, results will be reported to demonstrate that it is finally possible to carry out the measurements of radon and its decay products simply by a pancake Geiger-Muller counter. In spite of the 4 different sampling elements, the assessment of both the radon and its decay products can be carried out by using the same exposure time-frames, the same radiation detector, and the same counting procedures.

In particular, emphasis will be given to those measurements, which are difficult, if not impossible, to carry out with existing technology. Alternatively, these new passive samplers make it possible to use radon-decay products as tracers for the detection of all airborne nanoparticles, simply by a pancake G.M. counter.

The possibility to use the G.M. counter to measure radon and its progeny (and/or other airborne radionuclides) with passive low-cost samplers (no need of a pump), appears attractive to obtain a detection system with consumer-product-types of characteristics.

However, it is in the field of nanotechnology and/or nanotoxicology that these new passive sampling elements show promise for advanced research and new developments.

Author: Dr TOMMASINO, Luigi (Consultant)

Presenter: Dr TOMMASINO, Luigi (Consultant)

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