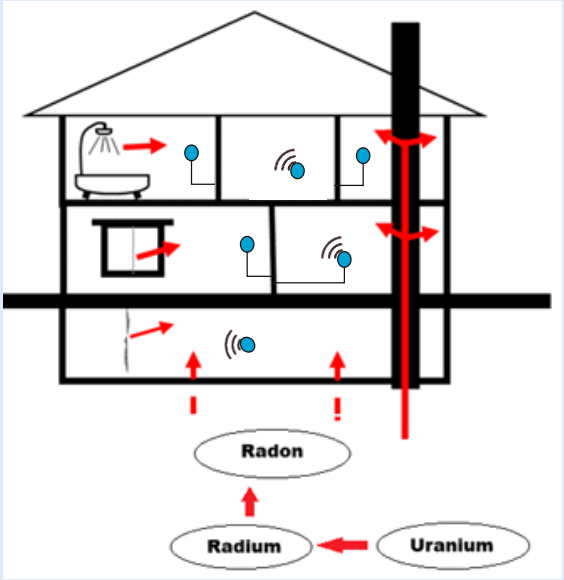
RADON NET

- Radon (^{222}Rn) is a natural component of the air we breathe. It is a radioactive noble gas with no color, smell or taste. Radon (^{222}Rn) is produced by the radioactive decay of ^{226}Ra in the decay chain of ^{238}U, which is present in varying concentrations in most rocks and soils.



- Radon is a significant source of ionizing radiation exposure for the general population, responsible for approximately half of all human natural radiation exposure. It decays into other radioactive isotopes – polonium, bismuth, and lead. When inhaled, these elements are trapped in the respiratory tract as metallic ions, which can expose the body to ionizing radiation, damage tissue, and potentially lead to lung cancer.

- When radon is released from the ground into the outdoor air, it is rapidly diluted and generally does not pose a problem. However, it can accumulate in high concentrations in enclosed spaces such as offices and residential buildings. Radon gas can enter buildings from the ground through leaks or cracks, especially in foundations, as well as through gaps between pipes and other structural defects. Certain quantities of radon can seep into buildings from the construction materials themselves, and some can also be from groundwater sources.

- Radon measurements are relatively simple to perform. There are different methods for measuring radon, such as passive detectors (like charcoal canisters or alpha track detectors) and active monitors. However, many of these methods rely on outdated models and aging technology. Additionally, detectors with long response times and unverified linearity can hinder timely action to mitigate radiation exposure.

- This project will develop new radon concentration detectors, enhancing and integrating current technology into networks that can deliver consistent, reliable radon measurements indoors. It will produce innovative, cost-effective sensor designs with faster response times, improved sensitivity, and lower uncertainty, along with methods for on-site calibration. Additionally, the project will establish a network of these sensors capable of covering large buildings and employing artificial intelligence to generate digital replicas.

Radon metrology: Sensor networks for large buildings and future cities

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