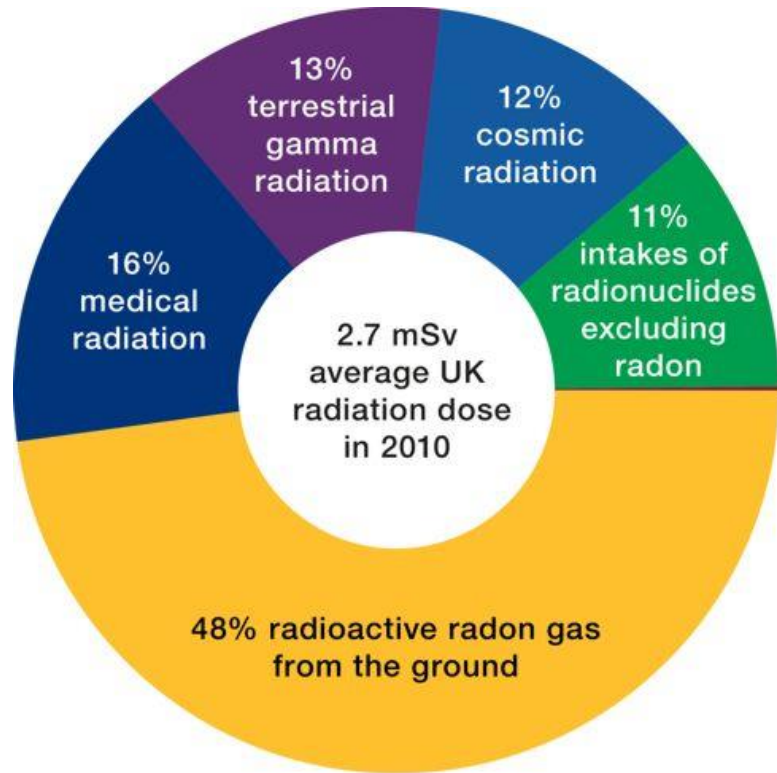


Naturally Occurring Radioactive Materials: Radon

Bálint Hantos

03. 18. 2021.

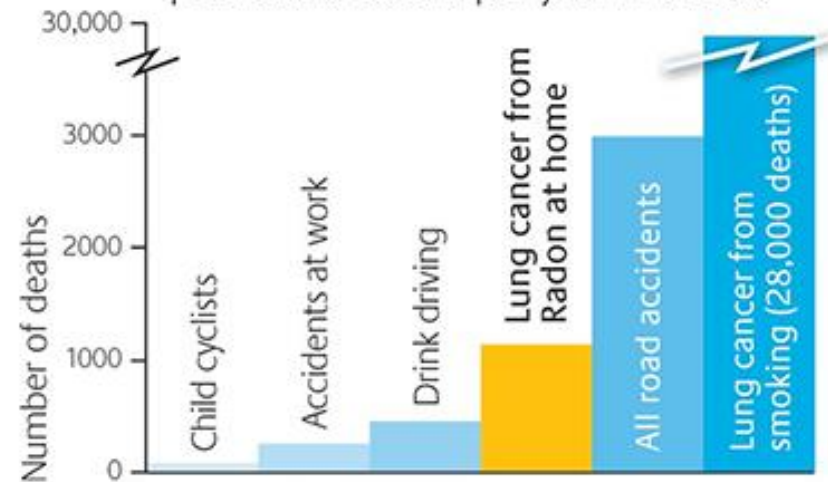
Introduction



Radon is the main source of radiation dose

Radon deaths

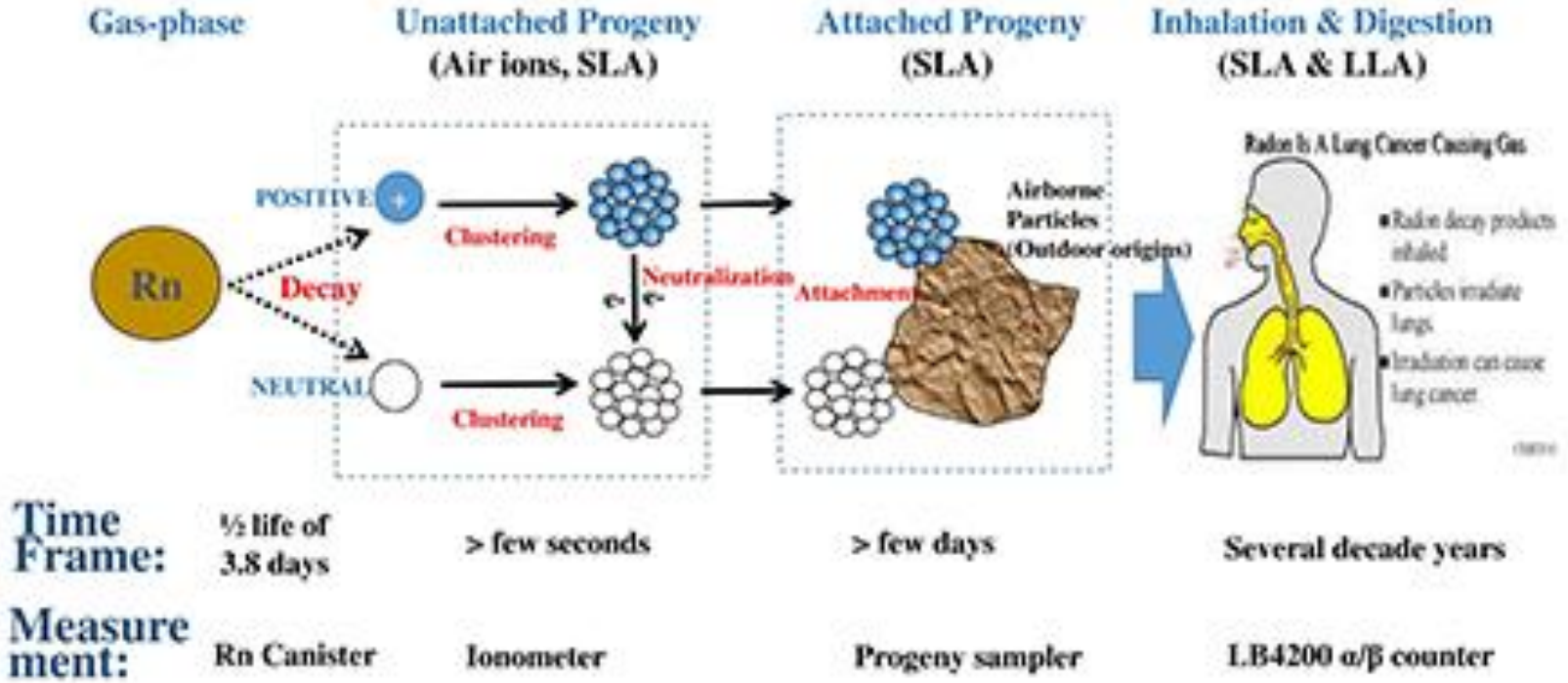
compared with other causes of premature deaths per year in the UK



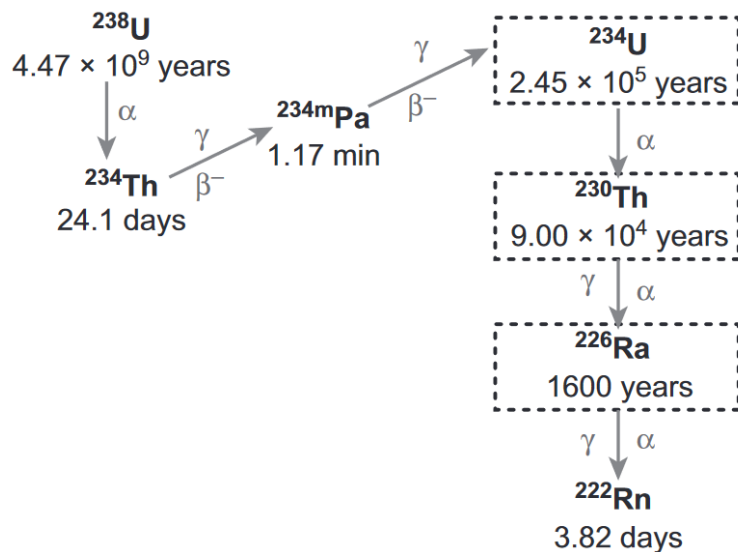
Radiation from radon is the 2nd leading cause for lung cancer

How radon affects our health?

Indoor Particle Radioactivity



Source of radon: U-238



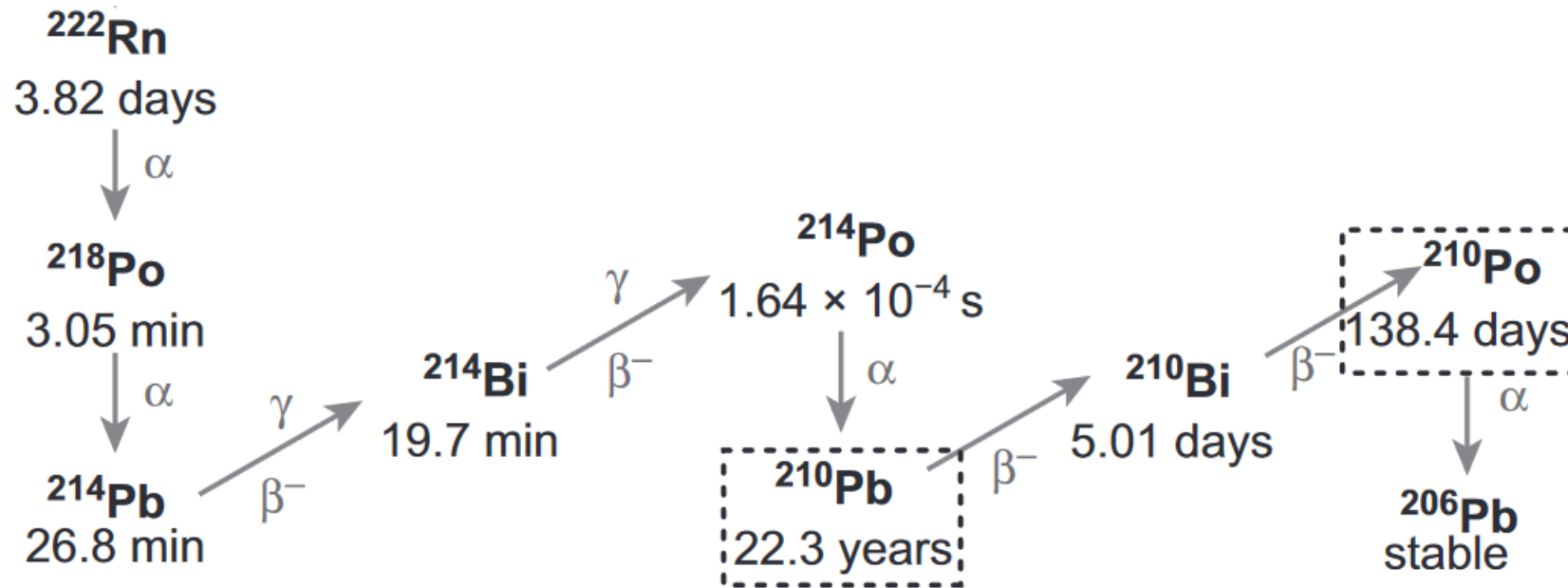
Origins:

- supernovae
- neutron star merger

Can be found in traces in most soils and rocks ($\sim 1\text{g/t}$)

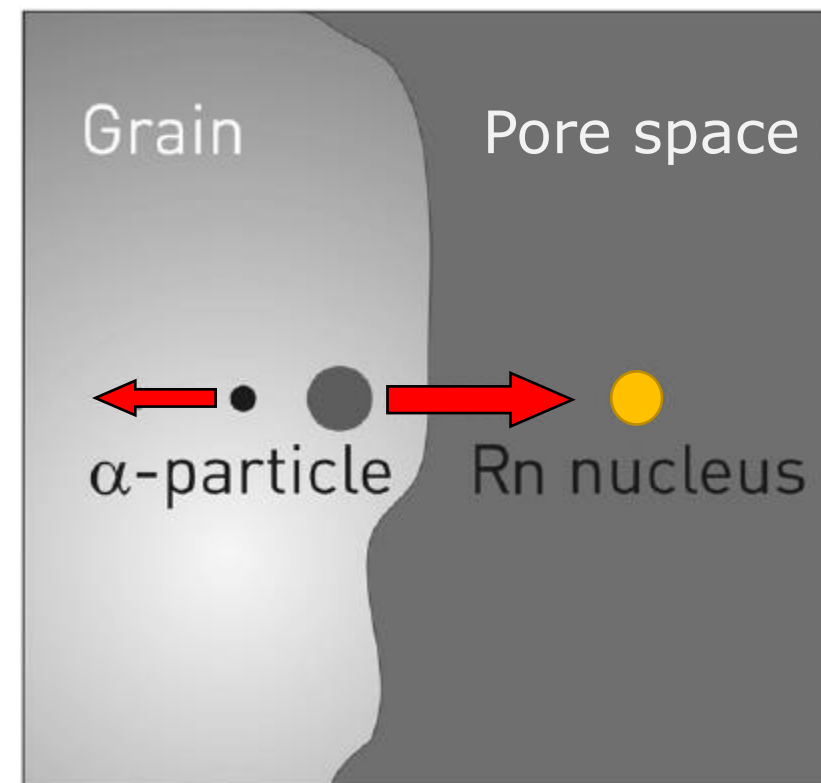
More prevalent in volcanic rocks and slate

Source of radon: U-238



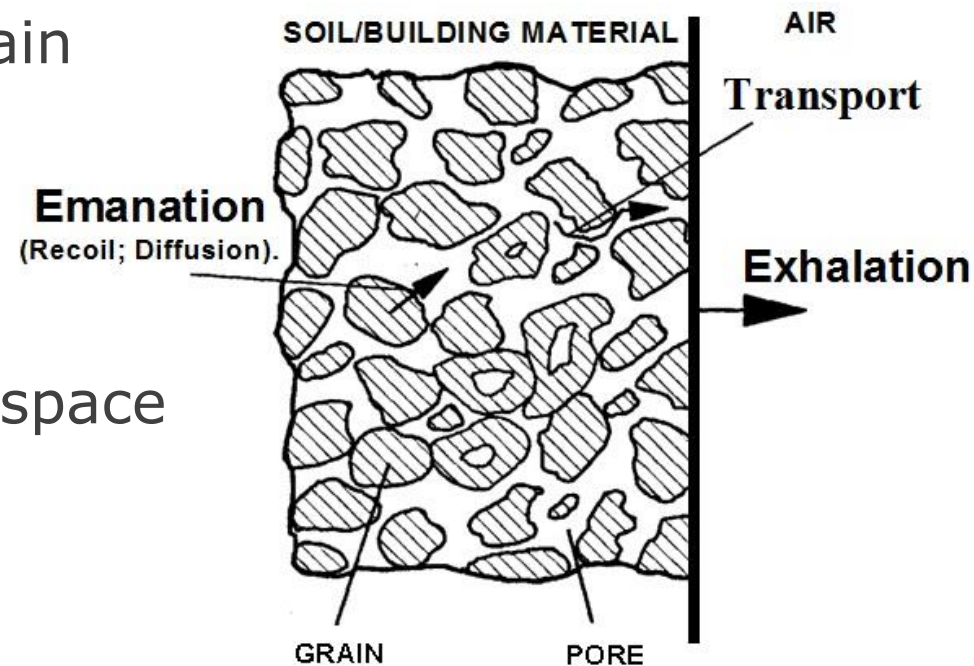
Radon formation

- U-238 decays into Ra-226 (after a while)
- Radium α -decays: radon atom recoils
- The chance of entering the pore space depends on:
 - how close Ra is to the grain surface,
 - the direction of the recoil.



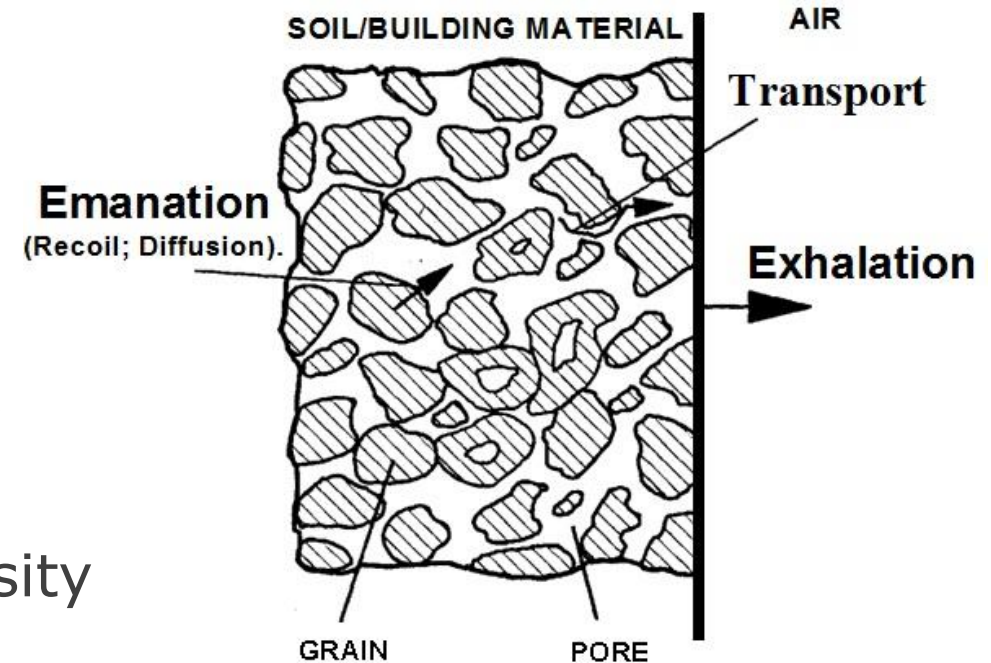
Radon formation

- The escaped Rn atom can be trapped again
- Water slows down/blocks Rn atom
- 10-50% of Rn atoms escape to the pore space
- This process is called Rn emanation



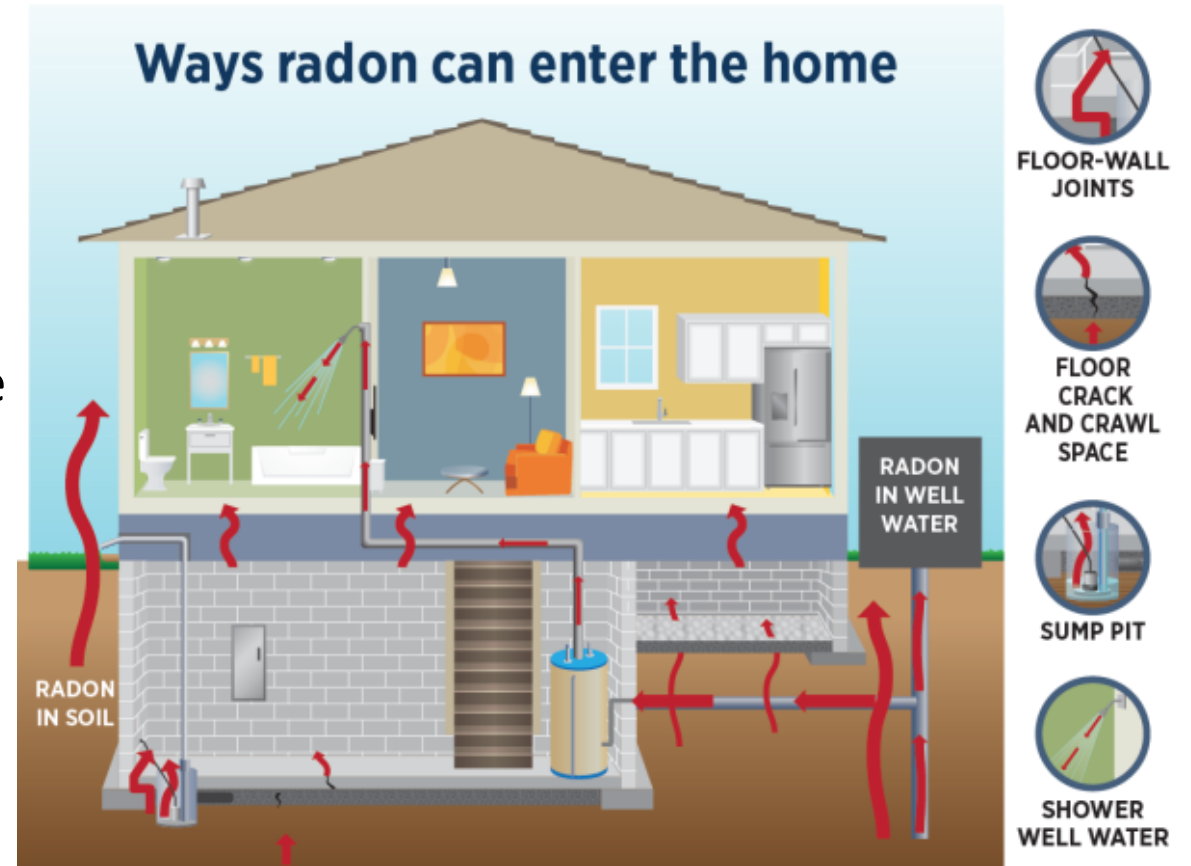
Radon movement

- Rn moves through physical processes
- Movement depends on:
 - moisture content
 - < 2.5 cm in water-saturated rocks or soil
 - > 2 m in dry rocks or soil before decay
 - fraction of pore and grain volume - porosity
 - permeability



Radon exhalation

- Rn usually escapes into the atmosphere
- Airflow towards a house:
 - air pressure: inside < outside
 - openings on the foundation of the house
- Entrance through water system
 - small public water systems
 - domestic wells



Radon in alternative medicine

