A survey of the radon level and the risk to radon exposure in underground working places in capitals in China

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Site selection

47 underground working places with different building type were chosen as surveyed site, where the working people worked there for over 8h everyday.

Surveying method

Solid state nuclear track detectors (SSNTD'S) was selected. The detectors had been exposed for three months in every site during summer and winter before etched. Data was obtained from reading the detectors using optical microscope.

Conclusions

The average radon concentration in underground working places in winter was apparently less than that in summer. The radon concentration in Shanghai was the lowest among these capitals. The radon level in all capitals are less than the limit of the safe level set for controlling radon and its daughters in underground spaces in China (400 $Bq.m^{-3}$ EEC_{Rn}). The average annual effective dose received by working people in these capitals is 1.34 mSv, as a result the lifetime fatality risk is 1.05×10^{-4}. It's safe for people working there.

References

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Dissolution of tremolite: An experimental study simulating conditions in the human lung

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The rate of tremolite dissolution was investigated in a flow-through reactor at 37°C, varying solution composition and pH to imitate conditions inside the human lung. Initial experiments were conducted to determine the pH dependence of the kinetics of tremolite dissolution using 1.54M NaCl solution over a pH range of 1 to 7. As expected, the rate of dissolution of tremolite decreases as the solution approaches neutrality. Gamble's solution, a simulated lung fluid, is composed of several organic species at various concentrations, including: citrate, lactate, glycine, tartrate, and pyruvate, as well as some inorganic salts such as sodium chloride, sulfate, and phosphate. A second series of experiments was conducted to examine the effects of each organic species individually, at the concentration they occur in Gamble's solution, on the rate of dissolution of tremolite at a given pH (~4.0) (Figure 1). The individual components exhibit varying effects on the rate of tremolite dissolution.

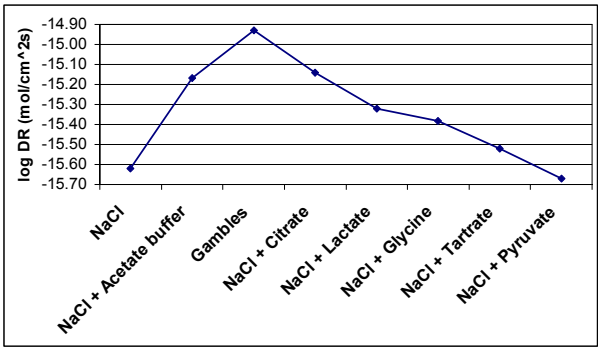

Figure 1. A comparison plot of log dissolution rate (DR) of tremolite for solutions containing individual components of Gambles solution at constant ionic strength and pH.

The component most effective in increasing the dissolution rate of tremolite, i.e., citrate, was then used in a third set of experiments. As expected, increased concentrations of citrate increase dissolution rate. However, even micromolar concentrations of citrate increase the dissolution rate significantly when compared to a NaCl solution of identical ionic strength and pH.