# Potential of fluids and migrations of oil-gas and uranium in Ordos basin, Northwestern China

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## Introduction

Ordos sedimentary basin is located in northwestern China and famous for the multiple energy and mineral resources, becoming the most important energy base in China. It was formed on the western margin of Sino-Korean para-platform (Ren et al., 1987) and consists of carbonates and clastic sedimentary rocks, whose deposition strated in Middle Proterozoic and lasted until the early Cretaceous, with maximun thinkness of more than 100000 meters.

## Results

Using the method of fluid inclusions, we indentified the 4 stages of potential of flluids in the basin, and the relative parameters are described as the follows: Stage I: with the the homogeneous tempertue between 130°C and 140°C, mainly existing in Bexi Group($C_2b$), its potential of flluids in the middle part of the basin is 17329 $m^2/s^2$ ; Stage II: with the the homogeneous tempertue between 120°C and 130°C, mainly existing in Shaxi Group($P_{2-3}s$), its potential of flluids in the middle part of the basin is 13221 $m^2/s^2$ ; Stage III: with the the homogeneous tempertue between 95°C and 120°C, mainly existing in Shaxi Group($P_{2-3}s$), its potential of flluids in the northern part of the basin is 15020$m^2/s^2$ ; Stage IV: with the the homogeneous tempertue of more than 185°C, mainly existing in Shaxi Group($P_{2-3}s$) and the sedimentary layers of the late Permian period, its potential of flluids in the northern part of the basin is 15310 $m^2/s^2$ .

The summarized result from the fluid inclusion study shows that the migrations of oil-gas and uranium have close relationship to the four stages of fluids participation.

## Acknowledgement

This study is under the auspices of the National Basic Research Program of China (2003CB214600).

## Reference

Ren J.S., Jiang C., Zhang J. and Qin D., (1997), Geotctonic evolution of China. Sci. Press, Beijing/Springer, Beillin, 203pp.

# *In-situ* identification of uranium minerals in concrete

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## Introduction

Predicting the fate of radionuclides from concrete waste forms requires understanding radionuclide-cement interactions and mechanisms of retention (i.e. sorption or precipitation). Sorption has been believed to be the dominant mechanism for uranium retention with cement grout materials, particularly under conditions far from saturation. However, this investigation demonstrates the formation of uranyl-minerals in concrete, consistent with the paragenetic sequence of uranyl-mineral stability, under conditions unsaturated and saturated uranium with respect to uranyl minerals.

## Experimental

*Specification for Concrete Encasement for Contact-Handled Category 3 Waste* (a) was used to prepare uranium-spiked concrete test specimens 1) under-saturated with respect to uranium solid phases, where sorption is believe to be the controlling mechanism for retention, and 2) over-saturated with respect to uranium solid phases.

## Results and Discussion

In undersaturted specimens, uranium initially appeared to be homogeneously distributed throughout the matrix. However, SEM analyses after one month revealed concentrated areas of uranium that suggested either 1) sorption through inner-sphere mechanisms as a precursor for precipitation of uranium mineral phases, or 2) diffusion and concentration of contaminants occuring within the matrix which eventually resulted in mineral formation, or 3) a combination therein.

Over a period of two months, SEM-EDS analyses of uranium-saturated concrete specimens displayed the formation and paragenesis of uranyl-oxyhydroxides (2 weeks) to uranyl-silicates (1 month) and finally to uranyl-phosphate (1-2 months) minerals.

The results of this study illustrate the importance of precipitation on uranium retention in cement grouts, the significance of trace elements on uranium geochemistry, and the importance of *in-situ* studies to understand uranium geochemistry.