Predicting reservoir fluid properties using absolute concentrations of canned cutting gas components

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The canned cutting gas data are the most frequently used geochemical approach to characterize reservoir fluid properties during petroleum exploration. Traditionally, canned cutting gas analyses are semi-quantitative and usually reported as C_1 through C_5 normalized, therefore increasing the uncertainty in respect to fluid prediction. Here, we developed a quantitative method for canned cutting gas analyses, and together with their carbon isotopic compositions and molecular parameters to identify reservoir fluid types and barriers.

The canned cuttings are received from the well site. Samples are routinely analyzed at intervals varying from 10 to 30m. A known volume of cuttings are homogenized with water in a gas-tight blender and a sample of head space is analyzed for methane, ethane, propane, butane and pentane. For absolute concentrations of cutting gas components, an internal standard is chosen and the relationship of GC response factor between standard and aimed gas components is constructed. By adding known amount standard into canned cutting system before GC analysis, absolute concentrations of canned cutting gas components can be calculated and reported as μmol.

If neglecting the lose of gas during drilling and transport to surface, degassing efficiency is the most important factor to influence absolute concentrate of gas components, which strictly depends on temperature and its holding time and rock characters. Here, temperature and its holding time are investigated and the results show that concentration of gas components goes up with an increase of temperature up to 60°C and then keep stable, while the holding time is a not a significant factor where there is almost no change from 30min to 60min. Stable carbon isotopic compositions of gas components are less affected by degassing efficiency and this is in agreement with the observation by GeoMark.

A case study from the Panyu low-uplift of Baiyun depression, South China Sea is presented. Quantitative data, integrated with DST results, preliminary criteria can be made to define whether the oil and/or gas reservoir identified by normal logging is a commercial pay zone, and therefore for further DST planning.

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Experimental study of solution-mineral interaction in the Qisanba uranium deposit, NW-China

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Introduction

The Qisanban U deposit is hosted by a sandstone aquifer with groundwater whose TDS ranging roughly from 8-12 g/L. All the past pilot acid and alkaline *in situ* leach uranium mining tests failed due to serious chemical plugging during the mining processes. To develop a new solution mining technique, leaching test of uranium ores in ammonium bicarbonate solution was carried out. The TDS of the solution was maintained around 2 g/L by dilution using fresh water, and the pH was kept as 6.0-6.3 by pumping CO_2 into the solution.

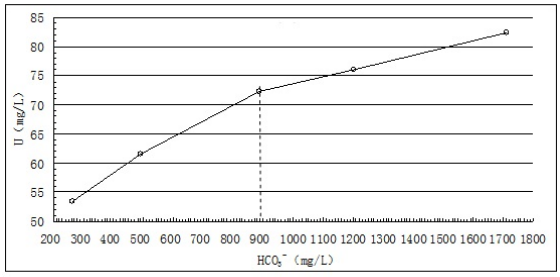

Figure 1: Uranium vs. HCO_3^- concentration of the solution

Result and discussion

The experiments showed that uranium can be leached effectively from the ores in ammonium bicarbonate solution without any chemical plugging. A new bicarbonate solution uranium mining technique based on groundwater dilution may be proposed.

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