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Low temperature synthesis of hydrocarbon fluid – bearing crystals

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The synthesis of fluid inclusions gives a good tool for understanding formation processes in the nature. Based on that assumption, the experiment of a creation of oil inclusions in salts in low temperatures was conducted.

The experimental steps were as following: -gas chromatography analysis of oils; - the s*ensu stricto* experiment of the synthesis of crystals with inclusions; - fluorescence analysis; - petrographic characteristics of new forms.

The procedure applied was similar to that presented by [2], while the whole experiment was described in detail by [1]. The present paper is a continuation and an enlargement of earlier activities.

Potassium and sodium chlorides were used to the synthesis. They display a solubility of about 25.5 g/100 g and 26.4/100 g of a saturated solution, respectively. The adequate slat amount was dissolved in the distilled water in a strict proportion aiming at the oversaturated solution. That solution was further heated with a constant monitoring of temperature until the saturation point was reached. In the temperature range close to the salt – water saturation and below the boiling of low hydrocarbons , the portion of petroleum of a known composition was injected, the sample being shaken and cooled.

The experiment was generally held below 60° C. The mixture of both the liquids was successively cooled aiming at the growth of the fluid inclusion- bearing crystals. Two types of oil were used, so there were two experimental runs. The crystallization time was variable. It lasted from hours (rapid cooling) through some days until the month (long growth). Crystals which precipitated from the halogens solutions injected with a petroleum were further cleaned using chloroform, dried and observed under the binocular. Fluorescence and petrographic observations under the polarization microscope in transmitted and reflected lights followed the creation of crystals. Crystals of different size were the result of the synthesis described. Their size ranges from 0.1 to some millimeters. The shape of the crystals is either typically cubic or slightly irregular. The synthetized crystals contain fluid inclusions generally of two types – brine inclusions (AQFI) and petroleum inclusions (HCFI) when the content is taken into the account. Mixed inclusions are present, too. The inclusions are either one phase or two phase ones. Hydrocarbons display a fluorescence in white-blue colors. Generally, the low temperature synthesis of the salt crystals has led to a formation of the relatively easy-to-obtain study material, that further might be an exact point for the fluid inclusion studies.

References

[1] Jarmołowicz-Szulc K (1998) PGI Archive materials, Warsaw, 37 pp

[2] Pironon J (1990) Am Miner 75: 226-229