Solvent swelling of kukersite oil shale kerogen has been previously investigated [1, 2]. Results show that swelling behavior of kukersite, as distinct from some other oil shales, does not follow regular solution theory. It is found that the ability of solvent to form hydrogen bonds is a property that mainly determines the swellability of kukersite kerogen. Swelling in binary solvent mixtures is a useful method for investigation of the role of specific interactions, such as formation and disruption of hydrogen bonds, in swelling process. The aim of this research is to compare two different experimental procedures that can be applied in the case of swelling experiments with binary solvent mixtures and to verify if swelling behavior of kukersite is in accordance with “titration model” proposed for coal by Green and Larsen [3].

The first-type procedure implies swelling experiments with pre-prepared binary solvent mixtures of exact composition. In the case of second procedure kerogen swelling is firstly carried out with one solvent, then the certain amount of other solvent is added to obtain required composition of solvent mixture. It is found that there is no fundamental differences between the results obtained applying these two techniques.

In order to investigate the role of strong H-bonding solvents in swelling process the experiments were done with addition of a very small amount of solvent with high electron donor number to the solvent with low electron donor number. Thermodynamic equilibrium cannot be affected because the influence of added solvent is insignificant. The notable increase in swelling ratio can be caused by disruption of kerogen-kerogen hydrogen bonds by strong H-bonding solvent. Reduced crosslink density results in the increased swellability of kerogen.

References