

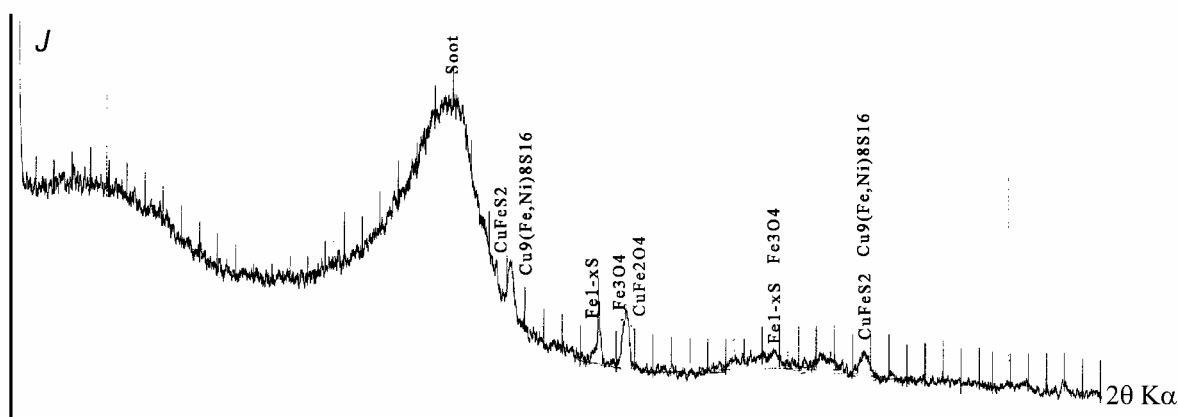
PYROLYSIS AND PARTIAL OXIDATION OF HEAVY OIL RESIDUE IN SUPERCRITICAL WATER

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The kinetics of dissolving, pyrolysis and oxidation of heavy oil residual (HOR) in supercritical water (SCW) were studied in a batch reactor and in a flow reactor at the pressure 30 MPa in the temperature range from 400 to 780°C. Different ways of reagents feeding into reactor were tested. The reaction time (i.e. residence time of reactants in reactor) varied from 15 to 600 s. Mass ratio of HOR to SCW was from 0.25 to 0.75, mass ratio of O₂ to HOR being from 0 to 0.25.

Molecular and elemental composition of reactants was analysed by different techniques. The studies have resulted in kinetic constants characterizing yield of most important products under HOR conversion in SCW [1 – 3]. As a sample, Figure shows X-ray diffraction pattern of crystalline and amorphous substances in insoluble residue of HOR pyrolysis at T = 750°C. The residue contains amorphous carbon (soot), 80%, and Fe and Cu-containing substances (CuFeS₂, Cu₉[Fe, Ni]₈S₁₆, Fe_{1-x}S, Fe₃O₄, CuFe₂O₄), 20%.



References :

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2. A.A. Vostrikov, D.Yu. Dubov, S.A. Psarov, Heavy Oil Gasification in Supercritical Water, in *Khimiya Nefti i Gaza [Oil and Gas Chemistry]*, vol. 2, STT, Tomsk, 2000, p. 511-515 (in Russian).
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