Oxidation of oil shale by flowing molten salts

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Molten salts have been used extensively in the chemical, nuclear, and solar thermal industries as a heat transfer fluid due to their favorable thermophysical properties. Proposals, therefore, have been made to apply molten salt technology to the in situ thermal recovery of oil shale to increase the energy efficiency and lower the CO_2 emissions of the recovery process. We report results of experimental investigations using flow tubes of the chemical interaction between oil shale from the Ghareb member of the Shfela Basin in Israel and molten nitrate and carbonate salts. Flow tube experiments where molten salts are injected through oil shale-filled tubes are conducted, and reaction exotherms and gas generation are measured. A simplified chemical reaction model is developed to explain the results.