

Title:**Synthesis of Solid Acid Catalyst from Spent Oil Shale****Abstract:** (Your abstract must use 10pt Arial font and must not be longer than this box)

Conventional surface retorts of oil shale generate significant quantities of spent shale in need of careful disposal. Moreover, the shale oil produced could not be used directly, requiring additional upgrading processes. These problems prevent the commercialization of oil shale development as yet. To address these problems, we have synthesized an inexpensive solid acid catalyst from spent shale. A silica-alumina catalyst was prepared by a simple activation method that basically includes NaOH treatment of spent shale by a fusion method at 600 °C, followed by an aging process at 25 °C. The weight ratio of NaOH/spent shale and the aging time was 1.2 and 8 hours, respectively. Catalytic cracking experiments for polymeric materials including U.S. western oil shale and synthetic polymers were carried out and the performance of the catalyst was assessed in terms of the shift of degradation temperature. The physicochemical properties of the catalyst were also characterized by XRD, BET and SEM. The catalytic performance of spent shale catalyst was comparable with that of commercial catalyst, demonstrating its effectiveness. This work allows on-site manufacturing of cracking catalyst for retorting and high recovery yields of light oil from oil shale, thus enhancing the economical efficiency of surface retort process.

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