

عنوان مقاله:

Optimization of Process Parameters for Catalytic Pyrolysis of Waste Tyre using Reactivated Fluid Catalytic Cracking Catalyst

محل انتشار:

فصلنامه انرژی و محیط زیست ایران (ایرانیکا), دوره 15, شماره 1 (سال: 1403)

تعداد صفحات اصل مقاله: 11

نویسندگان:

M. Bisong Obi - *Department of Chemical Engineering, Ahmadu Bello University, Zaria, Nigeria*

A. Abubakar - *Department of Chemical Engineering, Ahmadu Bello University, Zaria, Nigeria*

S. Yunusa - *Department of Chemical Engineering, Ahmadu Bello University, Zaria, Nigeria*

F. Mohammed - *Department of Chemical Engineering, Ahmadu Bello University, Zaria, Nigeria*

خلاصه مقاله:

This work investigated the optimization of process parameters for catalytic pyrolysis of waste tyre using reactivated spent Fluid catalytic cracking (FCC) catalyst. The waste tyre pyrolysis used design expert software as the optimization tool for this study. A 3-factor level CCD with 20 experimental runs was used with temperature, time and catalyst as the input parameters while oil yield, density and viscosity were the output variables. Thereafter, an experimental validation of the optimized parameters, which were not among the original experimental runs, was carried out. Pyrolysis was also carried out at the optimized conditions with un-reactivated catalyst and without catalyst to ascertain the contributions of the catalyst and its reactivation. Based on the optimum parameters, 48.5 wt. % oil (0.79 g/ml and 2.05 cSt) was produced with the reactivated catalyst, 43.4 wt. % (0.86 g/ml and 3.52 cSt) was produced with spent catalyst, and 51 wt. % oil (0.95 g/ml and 4.24 cSt) was produced without catalyst. The oil yield without catalyst was higher than with reactivated catalyst (R-CAT); but it however had the lowest fuel qualities while oil produced with catalyst in turn had higher quantity and quality compared to oil produced with catalyst. Therefore, the incorporation of density and viscosity of the oil in the optimization of the catalytic pyrolysis of waste tyre enhanced the improvement of yield and .quality of the oil produced

کلمات کلیدی:

Oil quality, Oil yield, Optimum parameters, Output variables/responses

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1737916>

