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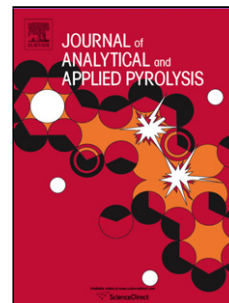
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Pyrolysis and combustion study of flexible polyurethane foam

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Abstract

The thermal degradation of flexible polyurethane foam has been studied under different conditions by thermogravimetric analysis (TG), thermogravimetric analysis-infrared spectrometry (TG-IR) and thermogravimetric analysis-mass spectrometry (TG-MS). For the kinetic study, dynamic and dynamic+isothermal runs were performed at different heating rates (5, 10 and 20 °C min⁻¹) in three different atmospheres (N₂, N₂:O₂ 4:1 and N₂:O₂ 9:1). Two reaction models were obtained, one for the pyrolysis and another for the combustion degradation (N₂:O₂ 4:1 and N₂:O₂ 9:1), simultaneously correlating the experimental data from the dynamic and dynamic+isothermal runs at different heating rates. The pyrolytic model considered consisted of two consecutive reactions with activation energies of 142 and 217.5 kJ mol⁻¹ and reaction orders of 0.805 and 1.146. Nevertheless, to simulate the experimental data from the combustion runs, three consecutive reactions were employed with activation energies of 237.9, 103.5 and 120.1 kJ mol⁻¹, and reaction orders of 2.003, 0.778 and 1.025. From the characterization of the

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