

## ABSTRACT

The semi-global kinetic models with a lumping approach were proposed for isothermal pyrolysis and oxidative pyrolysis of lignin. The temperature-dependent real char (r-char) fraction and dynamic heating ramp were considered in the models. The oxidative pyrolysis model was extended from the pyrolysis model published in the literature by supplementing it with oxygen-induced gas and r-char formation and subsequent tar and r-char oxidation. Model simulations reproduced the products formation of lignin pyrolysis and oxidative pyrolysis with remarkable accuracy. The results indicated that appreciable amount of lignin degradation occurred during the initial heating ramp, especially for oxidative pyrolysis at higher temperatures.