A carbon activation model with application to longan seed char gasification

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Abstract

In this paper a new structural model is presented to describe the evolution of porosity of char during the gasification process. The model assumes the char structure to be composed of bundles of parallel graphite layers, and the reactivities of each layer with the gasification agent are assumed to be different to represent the different degree of heterogeneity of each layer (i.e. each layer will react with the gasification agent at a different rate). It is this difference in the reactivity that allows micropores to be created during the course of gasification. This simple structural model enables the evolution of pore volume, pore geometrical surface area and the pore size distribution to be described with respect to the extent of char burn-off. The model is tested against the experimental data of gasification of longan seed-derived char with carbon dioxide and it is found that the agreement between the model and the data is reasonably satisfactory, especially the evolution of surface area and pore volume with burn-off.
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