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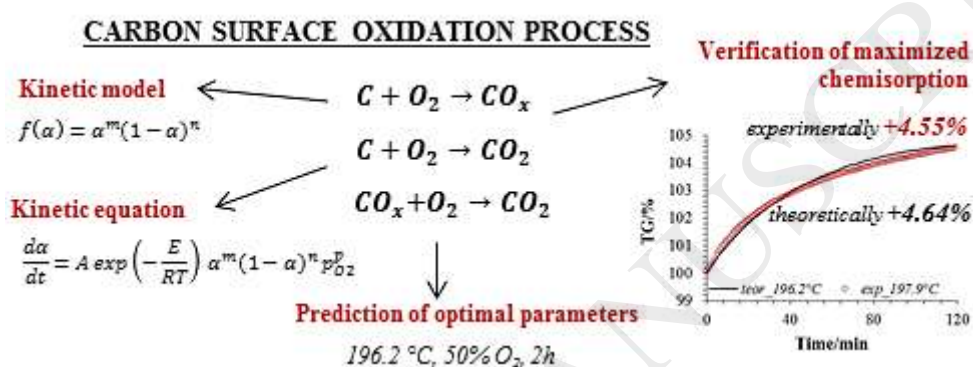
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Optimization of oxygen chemisorption on the carbon surface based on kinetic analysis of isothermal thermogravimetry

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GRAPHICAL ABSTRACT



HIGHLIGHTS

- Kinetics of carbon surface oxidation was explored by isothermal thermogravimetry
- Model consists of oxygen sorption, surface groups desorption and carbon gasification
- Truncated Sestak-Berggren model was used for the mechanism description
- Kinetic equation enables prediction of carbon surface oxidation degree

Abstract

The kinetics of oxidation of carbonaceous materials at low temperature (<300 °C) was explored by isothermal thermogravimetry. The suggested kinetic equation is based on the assumption of three reactions - creation of the oxygen surface groups, decomposition of created oxygen surface groups and carbon burn off. Truncated Sestak-Berggren kinetic model was used for mechanism description. The optimised kinetic equation has shown the good agreement between the theoretical and experimental data and enabled calculation of conditions (temperature, oxygen pressure) for effective carbon surface oxidation (maximal oxygen chemisorption). Predicted oxygen uptake at given conditions (4.0% at 226 °C in 20%

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