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Oxidation kinetics of Jurassic coal in Northwest China at low temperature by TG and FTIR analysis

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The spontaneous combustion risk of Jurassic coal in Northwest China is special and different from that of permo-carboniferous coal. TG-FTIR experiments of a typical Jurassic coal sample in north Shaanxi was carried out to identify the grading, gas graduating and oxidation kinetics characteristic, under four heating rates of 5, 10, 15, and 20 °C·min⁻¹ in an air atmosphere. The coal oxidation process of Jurassic coal at low temperature could be divided into two stages, mass loss stage and mass gain stage. The changing rules of apparent activation energy in the coal oxidation process at low temperature were determined by FWO and Kissinger methods. The model-fitting mathematical approach was used to identify the reaction kinetics mechanism functions at two oxidation stages of Jurassic coal in northwest China.