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The objective of this research work is to study the spontaneous combustion of Thai coals, some 11 coal samples from 7 sources were analysed. The tendency of spontaneous combustion experiments were performed by oxygen absorption method, wet oxidation method and differential thermal analysis.

One could divide these coals into three groups; high, medium and low susceptibility to spontaneous combustion, freshly-mined coals are more susceptible to spontaneous combustion. The first group, in the oxygen method, the rates of oxygen absorption at 5 hours were 30-54, 15-23 and 9-15 ml/h/100 g of high, medium and low susceptibility coals. In the wet oxidation method, the susceptibility is indicated by time to zero millivolt; which is found to be 90, 90-130 and more than 130 minutes for high, medium and low susceptibility coals respectively. In the differential thermal analysis method, the susceptibility is indicated by the crossing points of the thermogram and temperature profiles, which are found to be at 135, 160 and 180°C for high, medium and low susceptibility coals. This tendency to spontaneous combustion will decrease with stockpiling time. This is due to reduction of reactive surface areas which were partly oxidized since atmospheric oxidation of coal is an exothermic reaction and its rate increases with temperature, if the heat generated by oxidation is not dissipated and is accumulated in the coal pile, the coal is more prone to spontaneous combustion.

The three methods used in this investigation yielded similar result, so any of these methods can be selected accordingly. The benefit obtained from this work is the knowledge on the cause of coal self-heating which will be useful for future development of the research.