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Differences in $PM_{2.5}$ from various combusted materials

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$PM_{2.5}$ now is a very hot topic in China and the government is taking sustained efforts to resolve this problem. Especially, in Beijing, restricting vehicles, restriction on constructions, closing low-end factories that contaminate the environment, are several means to reduce the $PM_{2.5}$ generation by all respects. However, $PM_{2.5}$ emerges from many sources, including natural and anthropogenic discharges. One of the main anthropogenic sources is combustion. Fuel burning is a very important source. Many researchers have deeply studied the formation of $PM_{2.5}$ from coal combustion or oil combustions. However, the research on $PM_{2.5}$ from other combustions is a rarity. Hence, several materials were combusted including plastic, wood and glass as the research subjects in the same operation condition in this study. These three represent three kinds of materials, chemical organic matter, organic biomass and inorganic matter. Information such as $PM_{2.5}$ production and $PM_{2.5}$ morphology were collected. The findings suggested that different wastes would exhibit different $PM_{2.5}$ emission potentials in the same combustion operation condition and the morphologies of $PM_{2.5}$ from various combustion sources is also identifiable. By weighing the filter mass increase before and after combustion, the $PM_{2.5}$ yields could be calculated. Also by using SEM to analyze the $PM_{2.5}$ collected on the filter, $PM_{2.5}$ morphology is analyzed. Plastic combustion bears the highest $PM_{2.5}$ discharge potential during incomplete burning with tremendous spherical particulates in the images. Glass bears no $PM_{2.5}$ discharge potential for its incombustible properties. While wood would generate $PM_{2.5}$ in an irregular shape with a moderate production.

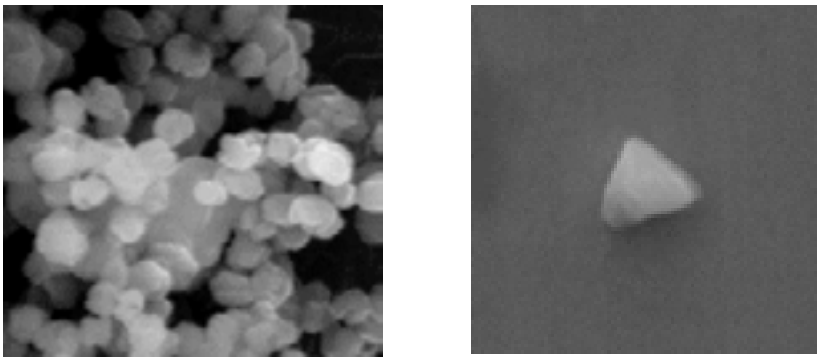

Figure 1: Images of the $PM_{2.5}$ from the combustion of plastic and wood (left plastic, right wood).

Recent Publications

1. Fenfen Zhu and Fawei Yan (2017) $PM_{2.5}$ emission behavior from laboratory-scale combustion of typical municipal solid waste components and their morphological characteristics. Energy & Fuels 111:855-876.
2. Fawei Yan and Fenfen Zhu (2016) Preliminary study of $PM_{2.5}$ formation during municipal solid waste incineration. Procedia Environmental Sciences 31:475–481.

Biography

Fawei Yan, studied his Masters of Engineering in School of Natural Resources and Environment, Renmin University of China, majoring in Environmental Science from 2014 to 2017. During school time (2010-2017), he participated in many research programs, for example, $PM_{2.5}$ Formation, Lignocellulose Degradation (Microorganism), Waste Combustion, Soil Analysis and so on. Especially, he took part in the research Antibiotics Degradation in Water in University of Nebraska Lincoln, USA for almost 2 months in 2013. Now he work in the Planning and Development Department, Beijing New International Airport. He has his expertise in Environment Research such as $PM_{2.5}$, waste combustion. His research interests are $PM_{2.5}$ Generation and Green Airport.

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