

Surface Electron Microscope Based Morphological and Chemical Characterization of Combustion Generated Aerosols

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Smoldering and Flaming combustion phases are very important combustion phases in biomass burning due to their different burning characteristics with respect to climate and health effects. In the present study, we have used a scanning electron microscope (SEM) to characterize the surface morphology of the samples collected during the burning of different woods and branches (Bamboo, Teak, Coconut shell, Jackfruit, Arjun, Akashi, Mango, Blackberry, Guava, and dry leaves) under flaming and smoldering combustion phases. Energy dispersive X-ray (EDS) coupled with SEM is used for the chemical characterization of samples collected during different combustion phases. We have noticed a variation in the morphology of particles for both the combustion phases. We have identified different shapes of particles that vary from regular to irregular including spherical, nearly spherical, triangular, capsule-like shapes. We have found different clusters of particles like chain-like structure, soot structure, and other irregular structures. We have found different morphological characteristics when the same wood sample is identified using SEM but for different combustion phases. Also, we have noticed a difference in the elements present in the sample for different combustion phases but same biomass. We have noticed the major contribution by elements like O, Si, C, and B in the scanned samples. Different elements such as C, O, K, Ca, B, Cr, Mn, Fe, Cu, Zn, Na, Mg, P, Nb, S, Pb, Cl, Al, Kr, Y, Ta, Rb are identified with change in their elemental weight percentage. Details will be presented.

Keywords: Atmospheric Aerosols; Smoldering; Flaming; Morphology; Elemental Composition

