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عنوان مقاله :

Real-Time Measurements of PM_{2.5} Oxidative Potential using Dithiothreitol (DTT) Assay in Delhi, India

Abstract : 200 Words

The oxidative potential (OP) of ambient particulate matter (PM) is a commonly used metric to link the aerosol exposure to its adverse health effects. In this study, we report the first-ever real-time measurements of ambient PM_{2.5} OP based on a dithiothreitol (DTT) assay in Delhi, during a late winter season (February 2019). The chemical composition of PM was also measured using various collocated online instruments to identify the chemical components driving the PM_{2.5} OP. The hourly averaged OP during the entire campaign ranged from 0.49-3.60 nmol/min/m³, with an average value of 1.57±0.7 nmol/min/m³. The secondary organic aerosols appear to be the major driver for the variability in the intrinsic OP of PM_{2.5}. Although, the average PM₁mass concentration at Delhi was 13-times the average PM_{2.5} mass concentration reported in Illinois, USA in a similar study, it was not accompanied by a proportionate increase in the OP (average volume normalized DTT activity of PM_{2.5} was only 5 times of that reported in Illinois). These findings reveal substantial spatial heterogeneity in the redox properties of PM and highlight the importance of determining the PM chemical composition along with its mass concentrations for predicting the overall health impacts associated with aerosol exposure.

Keywords: Oxidative potential, Particulate matter, Dithiothreitol.