

Chemical Processing of Dust in an Urban Environment (New Delhi)

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Delhi, the capital of India, faces severe dust storms in summer season every year which brings tons of dust from the arid environment to the study site. During long range transport, the dust particles have been reported to be mixed with the anthropogenic pollutants based on the remote sensing techniques (Dey, 2004; Dey et al., 2008). The mixing changes physical and chemical properties of the particle, which alter their optical and radiative properties as compare to that of pure dust. In view of aforesaid, PM₁₀ sampling was carried out at National Physical Laboratory (28.6139° N, 77.2090° E), New Delhi in summer of 2016. The collected particles were analyzed at bulk and individual particle level using state of the art spectroscopic and microscopic techniques.

The PM₁₀ mass concentration has been observed to be very high (i.e. 3285 ug/m³) during the dust storm occurred on 23 May, 2016. The particles collected during dust storm were observed to be rich in silicon (Si), iron (Fe), magnesium (Mg), calcium (Ca), and aluminum (Al) with highly non-spherical shapes; whereas, the post dust storm particles were observed to be rich in Si, Al, zinc (Zn), carbon (C), nitrogen (N) and sulfur (S). Calcite rich particles were found to be aged with nitrates while some dust particles were also observed to be externally mixed with carbon fractals. The bulk compositional analysis reveals that the post dust storm samples are rich in the local anthropogenic pollutants like S, C, lead (Pb) and mercury (Hg).

Key words: Mineral Dust, Transport, ageing, PM₁₀

References

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