



Chemical Composition of Organic Aerosols in Beijing: a Direct Infusion Ultrahigh Resolution Mass Spectrometry Study

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We investigated the chemical composition of daily PM_{2.5} filter samples collected at a central location in Beijing, China during winter 2016 and summer 2017 under high and low pollution conditions. The samples were characterised using direct infusion negative nano-electrospray ionisation ultrahigh resolution mass spectrometry to elucidate the composition and the potential primary and secondary sources of the organic fraction. The samples were compared with those from a road-tunnel site and an urban background site in Birmingham, UK, analysed in the course of an earlier study using the same method. We found significant differences in composition, particularly regarding the presence of aromatic compounds, which were much more prominent in winter and under high pollution conditions. The winter samples contained a large number of polycyclic aromatic compounds with particularly high carbon numbers, which were likely produced by residential heating. In addition, the number of sulphur- and nitrogen-containing compounds was compared with the sulphate respective nitrate concentration in the particle. Compounds containing only sulphur and compounds containing both nitrogen and sulphur showed a statistically significant correlation with inorganic sulphate concentration in the particles, indicating particle phase formation routes for these compounds. However, for the nitrogen-containing organic compounds, a correlation with inorganic particle phase nitrate was only found for the compounds containing both sulphur and nitrogen but not for compounds containing only nitrogen. This likely points to a difference in the formation process of these different compound classes.