

## Photo-oxidation of p-Xylene

A number of experiments on the photo-oxidation of p-xylene were carried out in an atmospheric simulation chamber made of FEP Teflon foil. The design and operating principles of the chamber are similar to those of another chamber in our laboratory, described previously (24). It is rectangular, has a volume of ca. 6500 litres and is surrounded by 12 Philips TL12 (40 W) lamps with an emission maximum at 310 nm and 12 Philips TL05 (40 W) lamps with an emission maximum at 360 nm. The chamber is operated at atmospheric pressure using purified air (Zander KMA 75) and the temperature and amount of water vapour in the chamber is monitored by a dewpoint meter (Vaisala DM70). Experiments are typically performed at  $295 \pm 2$  K and at a dewpoint temperature of  $223 \pm 5$  K. Between experiments the chamber is cleaned by flushing with the purified air at a flow rate of  $150 \text{ L min}^{-1}$  for a minimum of 6 hours.

P-xylene and NO<sub>x</sub> were added to the chamber in a flow of purified air. In all experiments the initial mixing ratios were ca. 5000 ppbV of toluene, 500 ppbV of NO<sub>x</sub>. Photo-oxidation was carried out for 6-7 hours using the Philips TL05 and TL12 lamps. The concentrations of p-xylene and NO<sub>x</sub> were regularly monitored by GC-FID (24) and a nitrogen oxides analyser (Thermo Scientific, model 42i) respectively. The formation and evolution of particles in the range 10-470 nm was monitored using a scanning mobility particle sizer (SMPS, TSI Model 3034).