Geophysical Research Abstracts, Vol. 7, 10533, 2005
SRef-ID: 1607-7962/gra/EGU05-A-10533

A review of indoor air chemistry

N. Carslaw

Environment Department, University of York, UK

nc12@york.ac.uk / +44-1904-432998 / +44-1904-434777

Indoor air pollutants arise from a number of sources, as diverse and wide-ranging as tobacco smoke, radon, cleaning products, carpets, paints and animal dander. These pollutants and in some cases, their by-products, have the ability to accumulate in our homes and offices, which owing to an increased awareness of energy efficiency, have become more air tight in recent years. Some pollutants can make their way indoors from the outdoor environment, ozone being a notable example. The combination of indoor and outdoor sources results in the concentrations of some common atmospheric pollutants regularly being higher indoors than out. Indeed, given that it is common for many people to spend around 80-90% of their time indoors, their main exposure to air pollutants is likely to happen in the indoor environment.

The major concern is that such a cocktail of pollutants might have effects on health. Indeed, reports of ill-health effects related to the indoor environment are common, with symptoms including eye and nose irritation, headaches, drowsiness, dizziness and reduced powers of concentration. However, given the diversity and number of sources of indoor pollutants, and the complex reactions between them, trying to pinpoint exactly what causes ill-health effects indoors is immensely challenging.

Much research in the past has focused on trying to link adverse health effects with concentrations of primary emitted species indoors, such as VOCs from paints and solvents. However, no link has been found. It is becoming evident with recent research that it is the oxidation products of the emitted species that are the likely cause of irritation, rather than the primary emissions themselves. Further, it would appear that one of the most important groups of indoor pollutants in this respect is the terpenes. The reactions of these species with ozone lead to a series of gas and particulate phase products, which are increasingly being identified as a potential source of the reported

ill-health effects.

This presentation will review our current knowledge of indoor air chemistry, including the species that exist at high concentrations indoors and the key reactions between them, in particular, the pathways that are likely to lead to products that result in adverse health effects.