# Compounds of interest

Volatile organic compounds (VOCs) are ubiquitous in indoor air and their origin is from a plethora of various emission sources including building related materials, furniture, equipment and consumer and household related products.

Trace levels of VOCs may be found in certain furnishing materials and polymeric materials such as vinyl, PVC, rubber, nylon and SBR-latex-backed floorings and carpets. VOCs are also present in particleboard furniture, plywood fibreglass, flooring adhesives, paints, wood panelling, caulking and paint remover. Therefore, new buildings or recently redecorated indoor environments have been associated with high concentrations of VOCs. The rate of emission of VOCs from these materials will decrease and eventually, these sources will reach a quasi steady emission rate in new buildings within weeks to months or even a year.

On the other hand, one of the major sources of pollutants affecting human health is traffic and combustion related processes. Fossil fuel combustion results in large quantities of primary particle emissions to the atmosphere, as well as gaseous compounds that convert to particles within hours to days after emission. These particles are mainly found in the fine fraction (PM2.5), which is defined as particulate matter with aerodynamic diameter less than 2.5 µm. A considerable number of epidemiological studies have found associations between PM2.5 and adverse health outcomes. Particulate matter is a mixture of many different components. Combustion-derived aerosol consists of solid carbonaceous soot particles (black carbon) that are associated with a complex mixture of organic compounds. Black carbon contributes significantly to fine particle mass and is an important cause of atmospheric visibility impairment. PAHs are produced by high-temperature reactions such as incomplete combustion and pyrolysis of fossil fuels and other organic materials. Major anthropogenic sources of ambient air PAHs include heating (coal, oil and wood), refuse burning, coke production, industrial processes and motor vehicles. In indoor environments, PAHs are generated from cooking, smoking, burning of natural gas, wood, candles and incense and are transported from the outdoors. Quinones are an oxygenated derivative form of PAHs, containing two ketone groups resulting in a fully conjugated dione structure. Similarly to PAH, quinones are also produced in combustion processes such as automotive emissions and wood smoke. However, quinones might also be formed by photochemical reactions of their parent PAHs with NO3, ozone and OH free-radicals.



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