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## Fuels And Combustion Sp Sharma.pdf

polycyclic aromatic hydrocarbons (pah) are a broad class of organic compounds that occur in fossil fuels, biomass, tobacco smoke, and other combustion emissions. they are suspected of being carcinogenic and mutagenic to animals and are human health concernants, because they are released into the environment in combustion processes [ 68 ]. they are also among the most persistent pollutants in the environment [ 68 ]. there are many pah, which are listed by iarc by category, subcategory, and chemical structure [see supplemental material, table s2 ] [ 1 ]. most pah with the simplest structure are derived from the incomplete combustion of organic materials such as wood, coal, oil, or natural gas. pah from coal-derived fuels have been shown to be in a class with pah from crude oil-derived fuels [see supplemental material, table s3 ]. a combustion source can be defined as the site at which chemical reactions occur that result in the emission of combustion gases. the defining characteristics of a combustion source are (1) that the source releases a mixture of products and (2) that the reaction occurs at temperatures high enough to allow the gas-phase reactions to occur, including both oxidation and reduction. the emissions from a combustion source, termed its primary emissions, are produced by the reactions of the fuel to oxygen, which is introduced at the air-fuel interface, and are further modified by the available oxidants. the primary emissions from a combustion source are therefore composed of a mixture of products, including (1) oxidants, such as nitric oxide (no), nitrogen dioxide (no<sub>2</sub>), ozone (o<sub>3</sub>), and hydrochloric acid (hcl) and (2) products, such as carbon monoxide (co), carbon dioxide (co<sub>2</sub>), formaldehyde (hcho), acetaldehyde (ch<sub>3</sub>cho), methyl ethyl ketone (2-mek), and benzene (c<sub>6</sub>h<sub>6</sub>) [see supplemental material, table s5 ] [ 1 ]. the primary emissions from a combustion source can be further modified through the oxidation of the oxidants to oxides of nitrogen (nox), through the reaction of the oxidants with other compounds (e.g., hcho), or through the reaction of the oxidants with co. the products of combustion reactions include many volatile organic compounds (voc), semivolatile organic compounds (svoc), and nonvolatile compounds, including pah.

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