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Chemical Characterization and Toxicologic Evaluation of Airborne Mixtures

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Abstract: Generators were constructed to produce both petroleum (SGF-2) and **red phosphorus**/butyl rubber (RP/BR) smoke aerosols. The petroleum smoke generator produced smoke concentrations of 2 to 10 mg/l for several hours with standard deviations less than 12%. Aerosol particles ranged in size from 0.6 to 1.6 micrometers MMAD with sigma sub g 1.5 to 1.9. Chemical composition of particles was not related to particle size. Using the Battelle-designed exposure chamber, male and female Sprague-Dawley rats were exposed to the petroleum aerosol at concentrations of 2.65 to 10.73 mg/l for periods of 1 to 6 hours. Animal deaths occurred **red** only in the 6-hour exposure to 10.73 mg/l. One of the dead animals had serosanguineous nasal discharge and frothy tracheal contents. The RP/BR smoke generator produced smoke concentrations of 2 to 10 mg/l. Aerosol particles were on the order of 0.9 to 1.4 micrometers MMAD with sigma sub g 1.5 to 1.7. Rats were exposed to 3.15, 4.33, 5.36 and 8.46 mg/l for 1 hour and 1.53 mg/l for 4 hours. The 4.33 mg/l exposure produced 50% mortality. Of the 40 animals exposed for 1 hour, 23 died within 14 days. All of these died on days 1, 2, 6, 8, 9, 10, or 11, suggesting both acute and delayed causes of death. Grossly observed pathology, which consistently involved the laryngeal and proximal tracheal region, included marked erosion and edema of these areas.

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