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Identification of Toxic Constituents in Tire and Road Wear Particle Extracts. Presented at  
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Tire rubber is a complex mixture of inert materials (polymers, fillers, resins) and various chemicals added as accelerators, activators, and antioxidants. There is concern that these constituents may leach from tire and road wear particles (TRWP) washed into freshwater sediments at sufficient concentrations to cause toxicity to aquatic organisms. Previous studies have demonstrated that aqueous extracts created by incubating tire treads at elevated temperatures are toxic to daphnids. In this study, TRWP generated using an on-road driving system were extracted under similar conditions, and acute toxicity to *Daphnia magna* was examined using a standard test protocol. TRWP extracts were acutely toxic to *D. magna*, with an EC50 of 5 g/L. Two targeted Phase-1 TIE procedures were conducted on the extract to identify the toxicant(s). Manipulations consisted of cation exchange, anion exchange, C18 solid phase extraction, and a hydrophilic DVB column to remove polar organic compounds. The TIE results revealed both an inorganic cation and an organic anion are involved in toxicity; candidate toxicants were identified based on analysis of the aqueous extract. The results also indicated that the two agents act antagonistically, and that the antagonistic interaction effect is one-way: from the cation to the organic chemical. Implications of these results with respect to TRWP in the environment will be discussed.