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Detection of Alkylaminium Salts in Particulate Matter by Ion Chromatography

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Smog chamber experiments were conducted to determine how amines react to form particles, specifically amine salts, in the atmosphere. All of the experiments were performed in a smog chamber at University of California Riverside's College of Engineering Center for Environmental Research and Technology (CE-CERT). A Particle Into Liquid Sampler Ion Chromatograph (PILS-IC) was used to determine the concentration of the amine salts formed during the experiment. It became apparent that the amines (trimethylamine, diethylamine, and butylamine) behave differently in the presence of oxidants. The oxidants used were N2O5 and hydroxyl, both under varying levels of humidity (0 - 40%). By order of decreasing amount, the amines that produced the highest concentration of amine salts were: diethylamine, butylamine, and trimethylamine. It was also discovered that the hydroxyl radical had a higher tendency to oxidize the carbon side chain of the amine, rather than form the salt as in the case of N2O5.