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Photolysis and OH reactivity of a Proxy for Isoprene-derived Hydroperoxyenals

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In isoprene-dominated regions, classical chemical mechanisms routinely under-predict the observed abundance and partitioning of hydrogen oxide radicals (HO_x = OH + HO_2). Recently-proposed mechanisms for the regeneration of HO_x during isoprene oxidation have demonstrated promise in chemical models; however, many of these theorized reactions remain untested in the laboratory. One such chemical scheme, commonly known as the Leuven mechanism, permits efficient OH recycling in low-NO environments via isomerization and decomposition of first-generation isoprene hydroxyperoxyl radicals. The hydroperoxyenal (HPALD) products of this chemistry are proposed to play a crucial role, as their photolysis and subsequent degradation may provide a heretofore unrecognized primary source of OH and HO_2 radicals. Using a custom-synthesized proxy molecule, we have conducted a series of laboratory chamber studies to characterize the unique chemistry of these putative HPALD compounds. Specific experiments were designed to assess 1) the photolysis quantum yield, 2) the photolysis OH yield, and 3) the rate and branching of reaction with OH. Key results will be compared with predictions for the isoprene-derived HPALD and placed in the context of our current understanding of OH recycling in high VOC environments.