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Simulating exoplanet hazes with high temperature discharge experiments EHSAN GHARIBNEZHAD, School of Molecular Science, Arizona State University, Tempe, AZ 85287, USA, JAMES, R. LYONS, School of Earth and Space Exploration, Arizona State University, 781 S Terreace Rd, Tempe, AZ 85287,USA, DAVID, P. WRIGHT, Goldwater Materials Science Facility LeRoy Eyring Center for Solid State Science Arizona State University, Tempe, AZ 85287,USA — Spectral observations of exoplanets have revealed only a few detections of atmospheric species, and only for hot Jupiters. Most notably, transit spectra have revealed absorption signatures due to Na and K in the visible, and H_2O and CO have been detected in the IR. The most consistent feature observed in transit spectra is a flat or nearly flat absorption spectrum from the mid-IR into the visible. Observations of GJ1214b (a superearth) exemplify this, with observations over 60 HST orbits yielding a completely flat spectrum. The most likely explanation for a flat absorption spectrum is the presence of clouds or photochemical hazes. Here we explore the latter via laboratory experiments. We heat a mixture of gases (H_2, H_2O, CH_4, N_2, and H_2S) in a fuzed quartz tube to 800 K in a tube furnace. Tungsten electrodes are used to generate 60Hz plasma discharge with an arc nearly spanning the width of the furnace. Thin films of particulates formed in the hot discharge are collected on fuzed quartz plates positioned beneath the tips of the electrodes. Measurements of the IR, UV-vis, and optical properties of the thin films are in progress, and will be reported at the meeting.

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