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Cavity ring-down spectroscopy in the ultraviolet region using calcium fluoride prism retroreflectors BRIAN LEE, AZER YALIN, Colorado State University — Cavity ring-down spectroscopy (CRDS) is a highly sensitive laser absorption technique that is useful for trace species detection of atoms and molecules in a range of applications. High sensitivity CRDS detection requires highly reflective mirrors, typically multilayer dielectrics. Such mirrors are available in many spectral regions, though not in the ultraviolet (UV) where optical absorption in the mirror layers tends to limit reflectivities. In our electric propulsion research, detection of boron nitride (BN) via ground state boron atoms near 250 nm is of particular interest. In order to improve the sensitivity of UV CRDS for BN detection, we are developing the use of prism retroreflectors made from calcium fluoride (CaF₂). In addition to higher cavity finesse at 250 nm, total internal reflection allows for broadband CRDS with a single experimental setup. We have obtained super-polished UV grade CaF₂ samples in order to make transmission measurements. The measurements are obtained by placing the CaF₂ samples as loss elements within a CRDS cavity. In this contribution, we present the measurement setup and results of initial CaF₂ material characterizations.

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