INTERSTELLAR NITRILE CHEMISTRY AS REVEALED BY CHIRPED-PULSE FTMW SPECTROSCOPY

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Nitriles make up a significant fraction of the known interstellar species, in part because their large dipole moments allow for easier detection. The presence of several nitriles in rich interstellar sources makes them a class of molecules that can be used to test proposal for molecule formation in the interstellar medium. We have performed a screening of the laboratory nitrile chemistry produced in a pulsed discharge source using the high abundance interstellar species CH_3CN and H_2S. The reaction products are identified by broadband rotational spectroscopy in a chirped-pulse FTMW spectrometer. We compare laboratory yields with column densities in Sagittarius B2(N) for several nitriles. We also describe the common lineshapes. So far 25 discharge-induced species, of which 18 are known interstellar molecules, have been identified in the laboratory spectrum. Because the column densities found in the GBT PRIMOS survey of Sgr B2(N) are similar to what is seen in laboratory relative population analysis, it seems to suggest the conditions created by the discharge nozzle may be similar to those found in the interstellar medium. Radicals of CH_3CN and H_2S are produced in high abundances and can explain many of the observed product species. These comparisons suggest that radical chemistry may dominate nitrile formation in some interstellar sources.