CAVITY RING-DOWN LASER ABSORPTION SPECTROSCOPY OF YTTRIUM AND NICKEL MONOIODIDES

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The absorption spectra of yttrium and nickel monoiodides at wavelength between 445-510 nm have been investigated using the technique of laser vaporization/reaction with free-jet expansion and cavity ring-down laser absorption (CRLA) spectroscopy. Yttrium monoiodide molecule was produced by reacting laser-ablated yttrium or nickel atoms and methyl iodide seeded in helium. For the YI molecule, several bands of the $D\ ^1\Pi$ - $X\ ^1\Sigma^+$ transition were observed and vibrational levels were analyzed. For NiI, two new transition systems were recorded and analyzed, namely the [21.3] $^2\Delta_{5/2} - X\ ^2\Delta_{5/2}$ and [21.9] $^2\Pi_{3/2}$ - $X\ ^2\Delta_{5/2}$ systems. Spectra of both ^{58}NiI and ^{60}NiI isotopic molecules were observed. Equilibrium molecular constants for both electronic states are reported and the equilibrium bond length was respectively determined to be 2.431Å for the [21.3] $^2\Delta_{5/2}$ state and 2.481 Å for the [21.9] $^2\Pi_{3/2}$ state.