A Molecular Beam Optical Study of YCC

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A weak signal near 13395 cm^{-1} in the low resolution laser induced fluorescence spectra of the laser ablated Y/ethylene supersonic expansion products was noted by Simard[a]. He speculated that it may be due to yttrium dicarbide. Following up on his suggestion, we have detected by medium resolution LIF three red degraded bands at 12895 cm^{-1}, 13395 cm^{-1} and 13896 cm^{-1} which we attribute to YCC. The resolved LIF spectra for the 12895 cm^{-1} and 13395 cm^{-1} band systems produce strong Stokes progressions with the features separated by approximately 560 cm^{-1}. These are tentatively assigned to the Y-CC ground state stretching. Additional weaker features are also observed. The high resolution LIF spectrum of the 12895 cm^{-1} band system was recorded. Attempts to model the spectrum as a $\tilde{A}^4$ A_1-$\tilde{X}^2A_1$ transition suggested by a recent ab initio calculation[b] are being made. Progress on the analysis will be presented.

[a]Benoit Simard, Steacie Institute-NRC, Ottawa Ontario, Canada, Private Communication.

[b]S. Roszak and K. Balasubramanian, Chem. Phys. Lett. **246**, 20 (1995).