LASER-INDUCED FLUORESCENCE SPECTROSCOPY OF ZIRCONIUM MONOCARBIDE

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Laser-ablated Zr metal is found to react with methane under supersonic jet-cooled conditions. New electronic bands in the 540-655 nm region have been detected by laser-induced fluorescence. Among these are bands which do not change when CD_4 is sustituted for CH_4 and whose lower state B value is 0.526_5 cm^{-1}; wavelength-resolved fluorescence indicates a lower state vibrational frequency of approximately 880 cm^{-1}, suggesting that the carrier is ZrC. Analysis of the high resolution spectra is complicated by irregularities in the Zr isotope structure, indicating severe rotational perturbations. The derived bond length of $r'' = 1.73_9$ Å is consistent with those found in other $4d$ transition metal monocarbides.