MASS-ANALYZED THRESHOLD IONIZATION AND STRUCTURES OF M_3C_2(M=Sc, La)

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M_3C_2 (M=Sc, La) clusters are produced by laser vaporization in a pulsed metal-cluster source and identified by photoionization mass spectrometry. Vibrationally resolved ion spectra are obtained with mass-analyzed threshold ionization (MATI) spectroscopy. The MATI spectra of M_3C_2 (M=Sc, La) exhibit a weak 0-0 transition, indicating a significant geometry difference between the neutral and ionized clusters. The ionization energies of Sc_2C_2 and La_3C_2 are measured to be 36398 (5) and 30051(5) cm^{-1}, respectively. In addition, the spectra of the two clusters display a number of vibrational intervals that are associated with M_3 deformations. Preliminary data analysis shows that both clusters have a C_{2v} bi-pyramid structure in the neutral state and a D_{3h} bi-pyramid structure in the ion state, and the spectra may be assigned to the $^1A_1'$ (D_{3h})$\leftarrow$ $^2B_2$ (C_{2v}) transitions.