MASS-ANALYZED THRESHOLD IONIZATION OF LaO_2

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Lanthanum oxide, LaO_2, is produced in a pulsed laser-vaporization metal-cluster source and studied by mass-analyzed threshold ionization (MATI) spectroscopy. From the MATI spectrum, the adiabatic ionization energy of LaO_2 is determined to be 40134 (5) cm^{-1} or 4.976 (6) eV, and La^+-O stretching and O-La^+-O bending frequencies are measured as 656 and 120 cm^{-1}. The measured ionization energy is about 3.0 eV lower than the value predicted by recent high-level ab initio calculations.[a] In this talk, we will discuss the discrepancy between the experiment and theory and the electronic transition observed in our experiment.

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[a] T. K. Todorova, I. Infante, L. Gagliardi, and J. M. Dyke, J. Phys. Chem. A 112, 7825 (2008).