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Spectroscopy of Cd₂ and Zn₂ molecules in free-jet supersonic beams: experimental and theoretical studies

Marek RUSZCZAK, Marcin STROJECKI, Marek KROSNICKI, Michał LUKOMSKI, Jarosław KOPERSKI

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Keywords

cadmium dimer, zinc dimer, potential energy curves, *ab initio* potentials, excitation spectra, fluorescence spectra, van der Waals molecules, supersonic free-jet beam

Abstract

A method of supersonic beam combined with techniques of laser spectroscopy and simulations of spectra were employed to study interatomic potentials of Cd₂ and Zn₂ molecules. Total laser induced fluorescence was recorded after an excitation of Cd₂ using laser radiation in the range of 2200-2260 angstrom. The observed structures are interpreted as due to the transitions from $v'' = 0$ in the ground $X^10_g^+$ state to vibrational levels below the potential barrier of the $^11_u(5^1P_1)$ electronic state. Studies of Zn₂ consisted of simulations of excitation and fluorescence spectra recorded at the $^10_u^+(4^1P_1)-X^10_g^+$ transition. In the simulations, both isotopic and rotational structures were taken into account.



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