ELECTRONIC SPECTROSCOPY AND VIBRATIONALLY MEDIATED PHOTODISSOCIATION OF $Co^+(H_2O)$, $Co^+(D_2O)$ and $Co^+(HOD)$

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Electronic spectra of gas phase clusters, $Co^+(H_2O)$, $Co^+(D_2O)$ and $Co^+(HOD)$, produced in a laser ablation ionization source, have been studied in the visible region, from 540 to 740 nm. The metal-ligand bond strength is determined from the dissociation onset. The photodissociation spectra show transitions to several excited electronic states. The resolved vibrational and partially resolved rotational structure are analyzed to give excited state vibrational frequencies and geometries. The O-H stretch frequencies in the ground electronic state are measured using vibrationally mediated photodissociation, in which IR excitation is combined with visible photodissociation.