THE ELECTRONIC STRUCTURE OF ScH^{++}, TiH^{++}, VH^{++}, CrH^{++},AND MnH^{++}

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We will discuss the electronic structure of the ground and low-lying excited states of the titled transition metal hydrides. Of these ScH^{++}, TiH^{++},and VH^{++}, are thermodynamically stable while CrH^{++}, and MnH^{++} are expected to be very long lived. While the charge distribution for each molecule is approximately $M^{+1.85}$ $H^{+0.15}$ the nature of the bonding changes very rapidly from a conventional sigma bond in ScH^{++}, to what may be described as an antiferromagnetic coupling of the Mn^{++} ion to the H atom in MnH^{++}. We will discuss trends in D_e , bond lengths and vibrational frequencies and will compare with the corresponding neutral and monopositive hydrides.