LUMINESCENCE OF Ce^{3+} IN THE PEROVSKITES $ME(Hf,Zr)O_3$ ($ME=Ca^{2+}$, Sr^{2+}, or Ba^{2+})

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We will present results on the luminescence of Ce^{3+} in the $ME(Hf,Zr)O_3$ ($ME=Ca^{2+}$, Sr^{2+}, or Ba^{2+}) perovskites, where Ce^{3+} replaces the divalent ion in these materials. Previously, we have presented results where the Ce^{3+} luminescence was quenched at lower temperatures in $BaHfO_3$ compared to both $CaHfO_3$ and $SrHfO_3$. This quenching was initially ascribed to photoionization of the Ce^{3+} ion that is equivalent to an electron transfer between Ce^{3+} and Hf^{4+} and is thermally activated. In this paper, we expand our previous studies by analyzing Ce^{3+} luminescence in the isostructural zirconate perovskites. The effect of switching from hafnate to zirconate hosts and charge compensation on the luminescence of Ce^{3+} will be investigated with respect to the crystal field splitting, centroid position of the 4f→5d band, and quenching behavior of these materials. These differences will be correlated with the structural and electronic changes that occur in these host lattices.