This thesis present the structural, magnetic and dielectric properties of interesting orthochromites such as $SmCrO_3$ and $GdCrO_3$ by substituting transition elements, Mn and Fe at the Cr site and Y at Gd site. The samples were prepared in single phase form using the sol-gel route and the prepared samples are found to crystallize in orthorhombic structure with *Pbnm* space group. All samples of $SmCr_{1-x}M_xO_3$ (M = Mn or Fe) series exhibit antiferromagnetic (AFM) transition with an exception of $SmCr_{0.50}Mn_{0.50}O_3$ having ferromagnetic (FM) transition at T_C = 70 K. In Mn substituted $SmCrO_3$ compounds interesting temperature induced magnetization reversal (MR) is observed for x = 0.10 - 0.30 samples with magnetic compensation temperature (T_{comp}) increasing from 51 K (x = 0.10) to 126 K (x = 0.30) whereas in case of Fe substitution, the magnetization reversal is observed only for x = 0.10 and x = 0.15 samples with a higher T_{comp} of 75 K and 148 K respectively. Similarly, in $GdCr_{1-x}M_xO_3$ (Mn or Fe) the temperature induced magnetization reversal is observed for x = 0, 0.05, 0.40 and 0.50 samples for Mn substitution whereas the magnetization reversal is found to be suppressed upon Fe substitution. In case of $Gd_{1-x}Y_xCrO_3$ (x = 0 - 1.0) samples the magnetization reversal is observed upto x = 0.70 with magnetic compensation temperature decreasing from 136 K (x = 0) to 42 K (x = 0.70). The origin of magnetization reversal is mainly explained on the basis of competition between the FM component of canted Cr^{3+} ions (M_{Cr}) and the paramagnetic moments (PM) of Mn^{3+} /Fe^{3+}ions and Sm^{3+}/Gd^{3+} ions under the influence of negative internal field arising from the antiferromagnetically ordered Cr^{3+} ions. Tunable exchange bias (EB) behavior with sign reversal of exchange bias field is also observed in samples showing magnetization reversal behaviour and it is attributed to the competition between the FM moment of canted Cr^{3+} ions and the PM moments and their different temperature dependences. However, magnetization reversal in samples of $GdCr_{1-x}Mn_xO_3$ with x = 0.40 and x = 0.50 and the tunable EB field in x = 0.50 are attributed to the competing canted AFM interaction in Cr^{3+}– O^{2-}– Cr^{3+} networks, collinear AFM interaction in Mn^{3+}– O^{2-} – Mn^{3+} networks and the paramagnetic moments of host Gd^{3+} ions and some of the Mn^{3+} ions. Field induced bipolar switching of magnetization is observed in some of the samples showing magnetization reversal below their compensation temperature. The obtained results provide a way of tuning magnetization as well as exchange bias field in a single magnetic system, which may find application in magnetic switching devices.