

## Supplementary Information

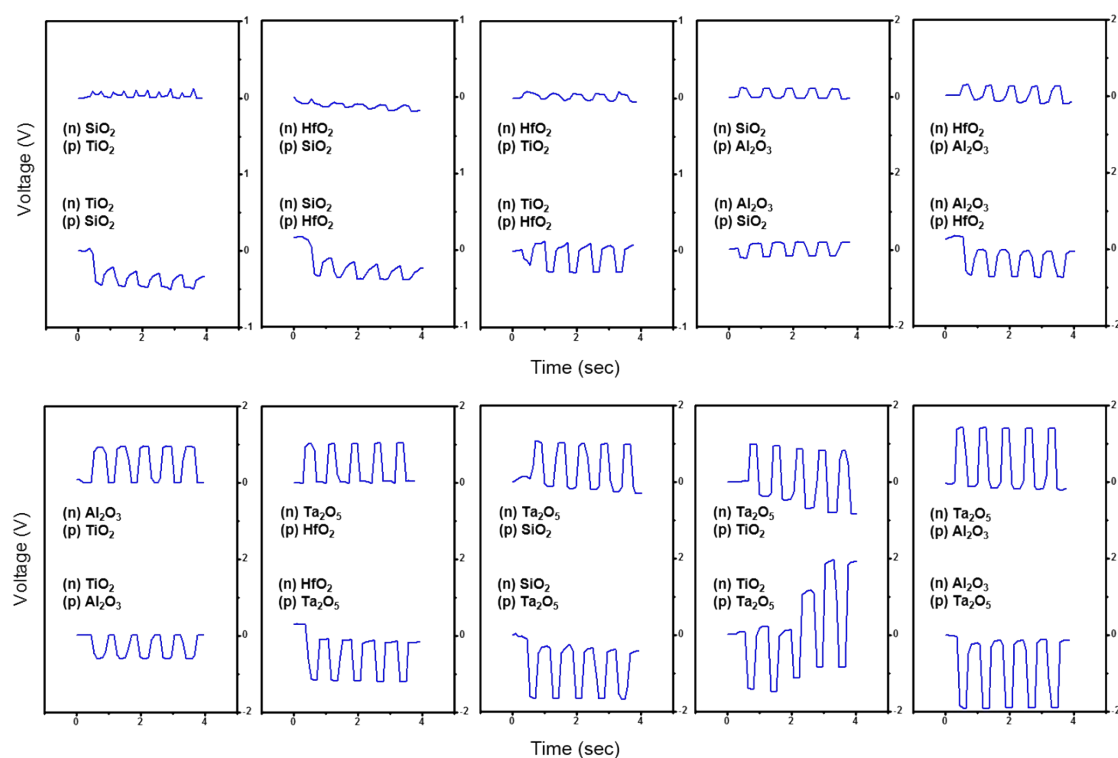


Fig. S1. The  $V_{oc}$  data measured in order to list triboelectric polarity of oxide dielectric materials in forward and reverse connection.

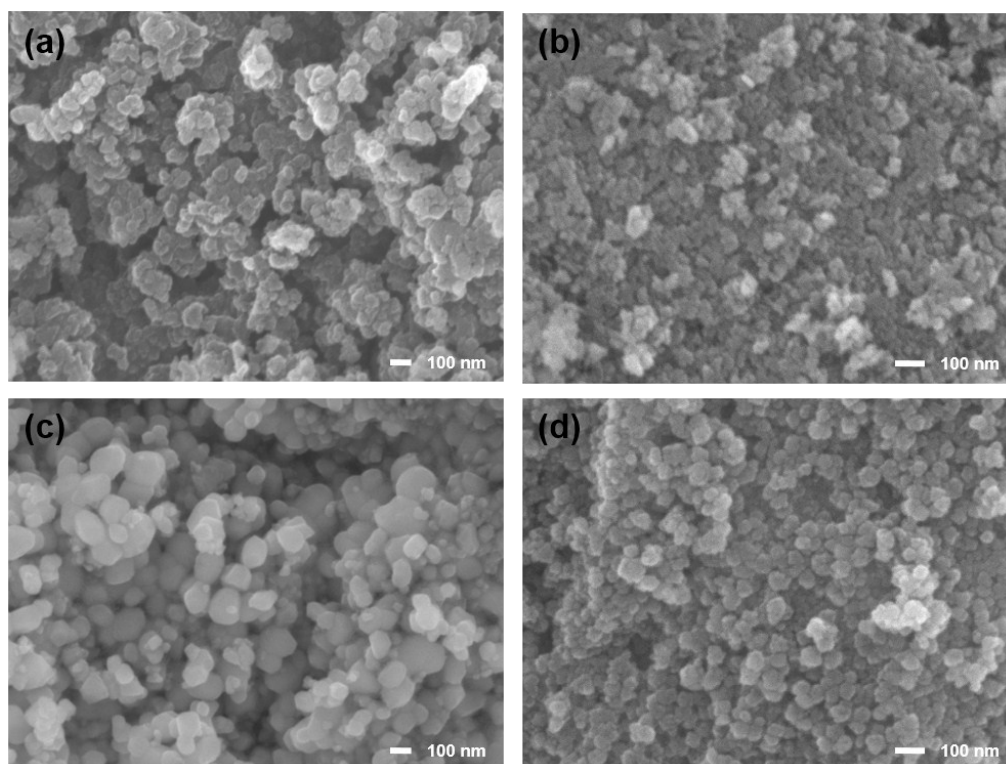


Fig. S2. SEM image of (a)  $\text{SiO}_2$ , (b)  $\text{Al}_2\text{O}_3$ , (c)  $\text{HfO}_2$ , and (d)  $\text{TiO}_2$  NPs.

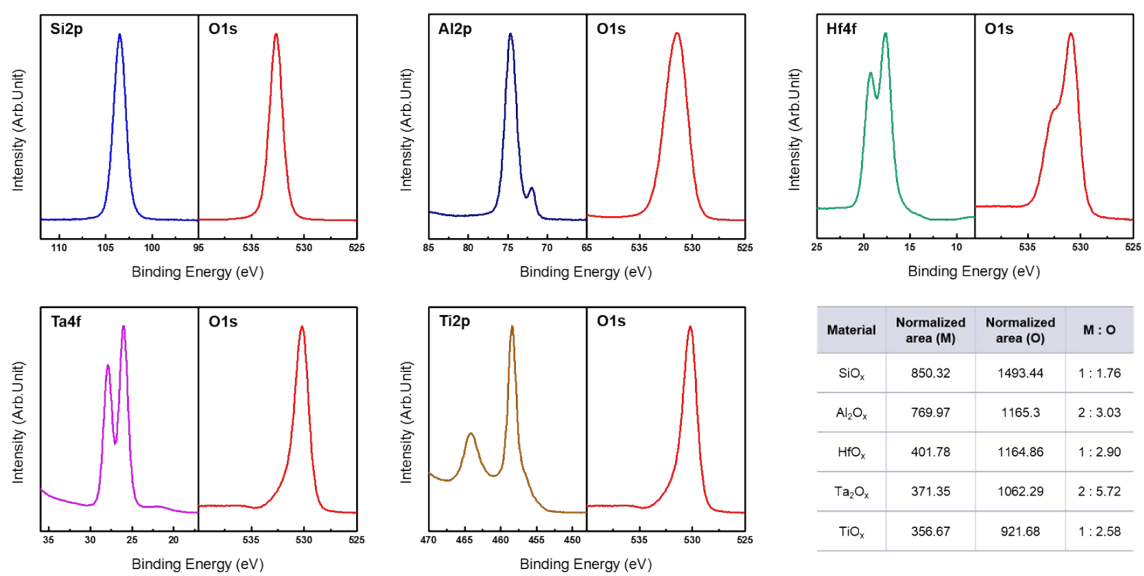


Fig. S3. XPS spectra of  $\text{SiO}_2$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{HfO}_2$ ,  $\text{Ta}_2\text{O}_5$  and  $\text{TiO}_2$ , and a table of information from the XPS data.