**Epitaxial ferroelectric doped HfO2 thin films on Si(001)**

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Ferroelectric HfO2 is a promising material for new memory devices, but the microstructure of HfO2 films needs to be better controlled, and some properties such as endurance have to be improved. Research of ferroelectric HfO2 is mainly focused on polycrystalline films. In contrast, epitaxial films have been much less investigated [1]. The recent stabilization of the orthorhombic ferroelectric phase in epitaxial doped-HfO2 films on perovskite La0.7Sr0.3MnO3 electrodes has allowed an important progress, including the control of the formed crystalline polymorphs through substrate selection [2,3]. It has also allowed the epitaxial integration of doped-HfO2 on Si(001) [4-7]. Here I will show that different buffer layers permit epitaxial growth on Si(001) of Hf0.5Zr0.5O2 and other doped-HfO2 films exhibiting excellent ferroelectric properties. Epitaxial doped-HfO2 films on Si(001) have high polarization, endurance and retention. These properties can occur simultaneously, without the dilemmas often seen in polycrystalline samples between these three properties. The robust ferroelectric properties are observed in films even thinner than 5 nm. The epitaxial doped-HfO2 films on Si(001) are thus of great interest for understanding ferroelectric properties and for prototyping devices.

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