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Supporting Information

Effect of H_2S pre-annealing treatment on interfacial and electrical properties of $HfO_2/Si_{1-x}Ge_x$ (x = 0–0.3)

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Table S1. Compositional analysis results calculated using XPS spectra in Figs. 5−7. Here, the carbon concentration was not included, and the units are at.%.

Sample	Si		$Si_{0.85}Ge_{0.15}$		$Si_{0.7}Ge_{0.3}$	
	w/o H_2S treatment	w/ H_2S treatment	w/o H_2S treatment	w/ H_2S treatment	w/o H_2S treatment	w/ H_2S treatment
Si (substrate)	100	95.8	82.8	76.2	70.5	59.4
Si (oxide)	-	3.2	-	1.1	-	4.1
Ge (substrate)	-	-	15.9	12.1	28.1	18.9
Ge (oxide)	-	-	1.3	6.4	1.4	10.4
S	-	1	-	4.2	-	7.2

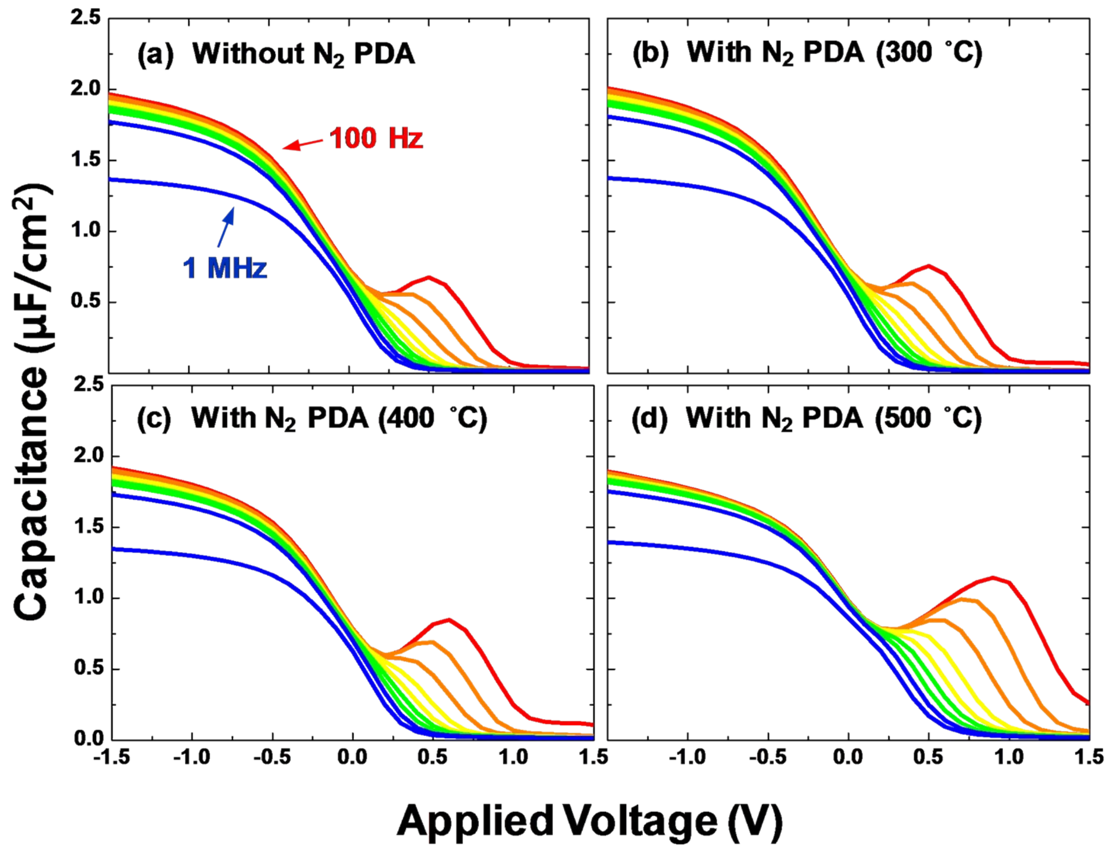

Fig. S1. Multi-frequency C–V responses measured from HfO_2 (~5 nm, according to spectroscopic ellipsometry measurement) capacitors fabricated on $Si_{0.7}Ge_{0.3}$ substrates (a) without and (b–d) with PDA. PDA was performed directly after HfO_2 deposition for 30 s under N_2 flow using RTA, and its temperature was varied: (b) 300, (c) 400, and (d) 500 °C. All fabricated capacitor samples underwent additional PMA at 300 °C for 30 min in forming gas environment (4 vol.% H_2 balanced with N_2).