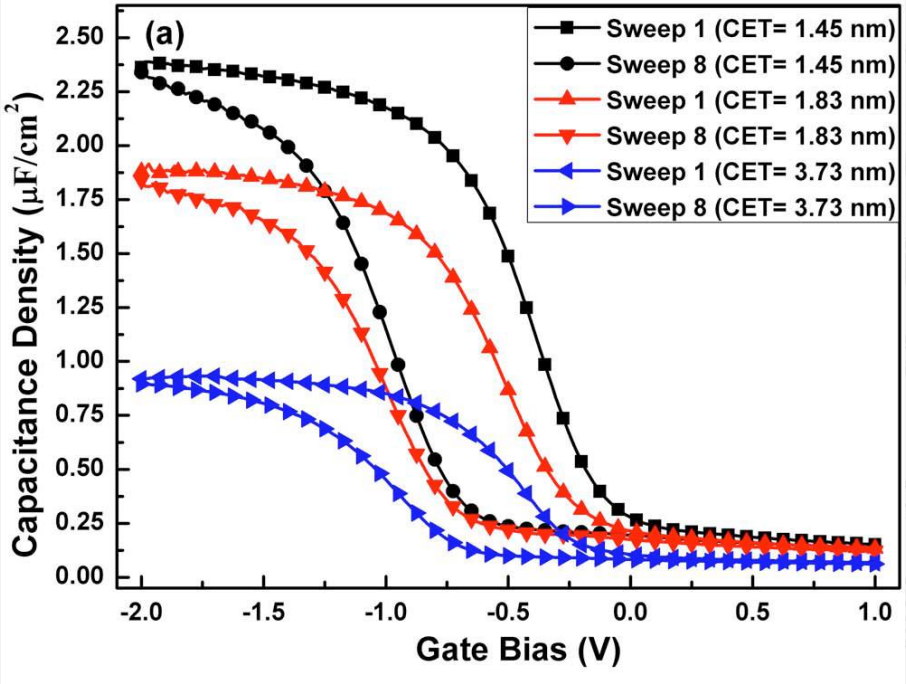
EE669: VLSI Technology

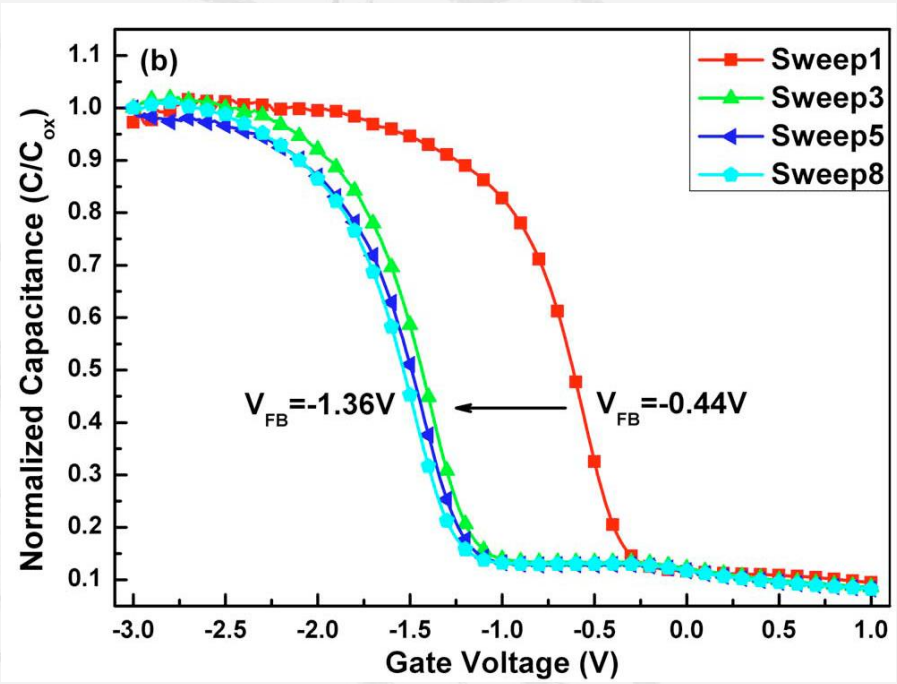
Apurba Laha
Department of Electrical Engineering
IIT Bombay 400076

Email: laha@ee.iitb.ac.in, Tel: **022 25769408**

Office hour: Friday 10:00 – 11.00 AM, EE Annex, Room: 104

MOS-Interface instability





a *C-V* characteristics of single crystalline Gd2O3 on Si(100(substrate with Pt as top electrode. b Normalized *C-V* characteristics of single crystalline Gd2O3 on Si100 substrate with W top electrode

APPLIED PHYSICS LETTERS 92, 152908 (2008)

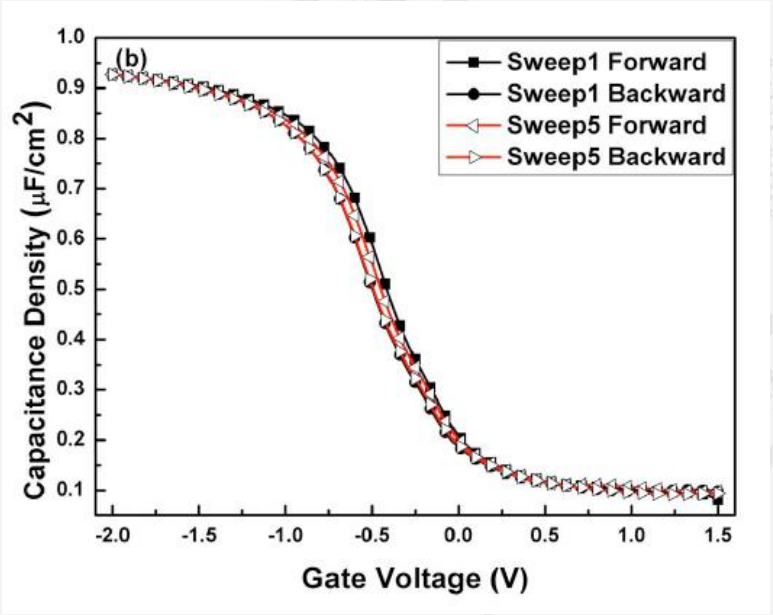
Effective passivation of slow interface states at the interface of single crystalline Gd_2O_3 and Si(100)

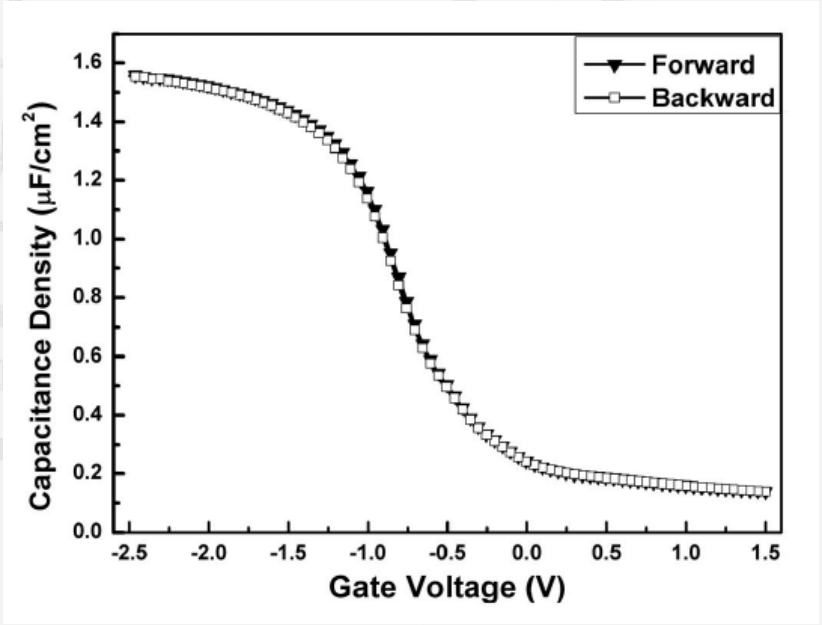
Qing-Qing Sun,[1] Apurba Laha,[2] Shi-Jin Ding,[1,a)] David Wei Zhang,[1,a)] H. Jörg Osten,[2] and A. Fissel[3]

[1]*State Key Laboratory of ASIC and System, Department of Microelectronics, Fudan University, Shanghai 200433, People's Republic of China*

[2]*Institute of Electronic Materials and Devices, Leibniz University, Appelstr. 11A. D-30167 Hannover, Germany*

[3]*Information Technology Laboratory, Leibniz University, Schneiderberg, 32, D-30167 Hannover, Germany*

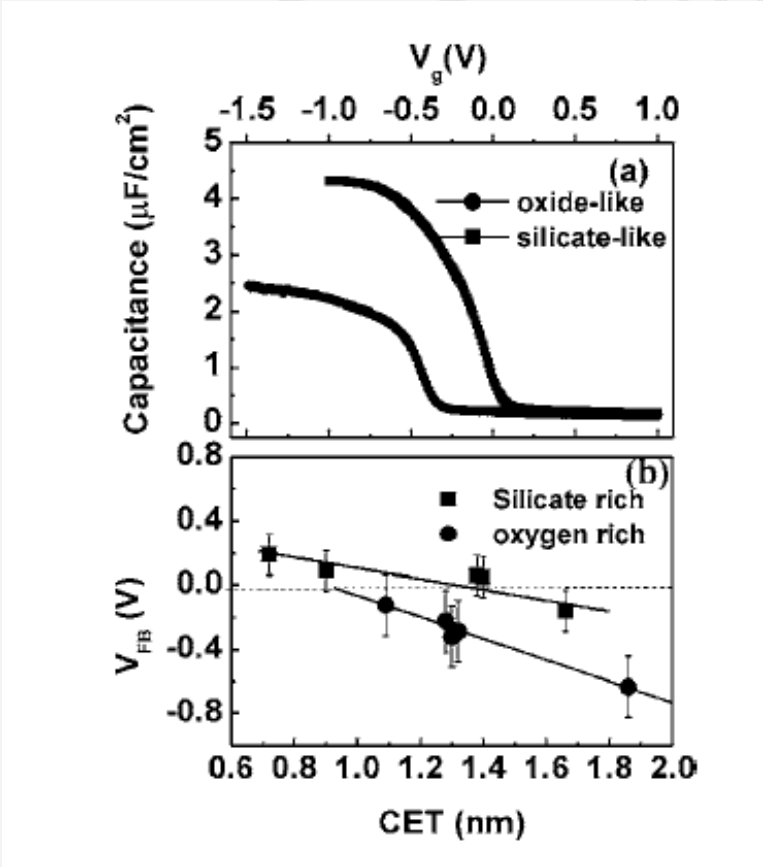


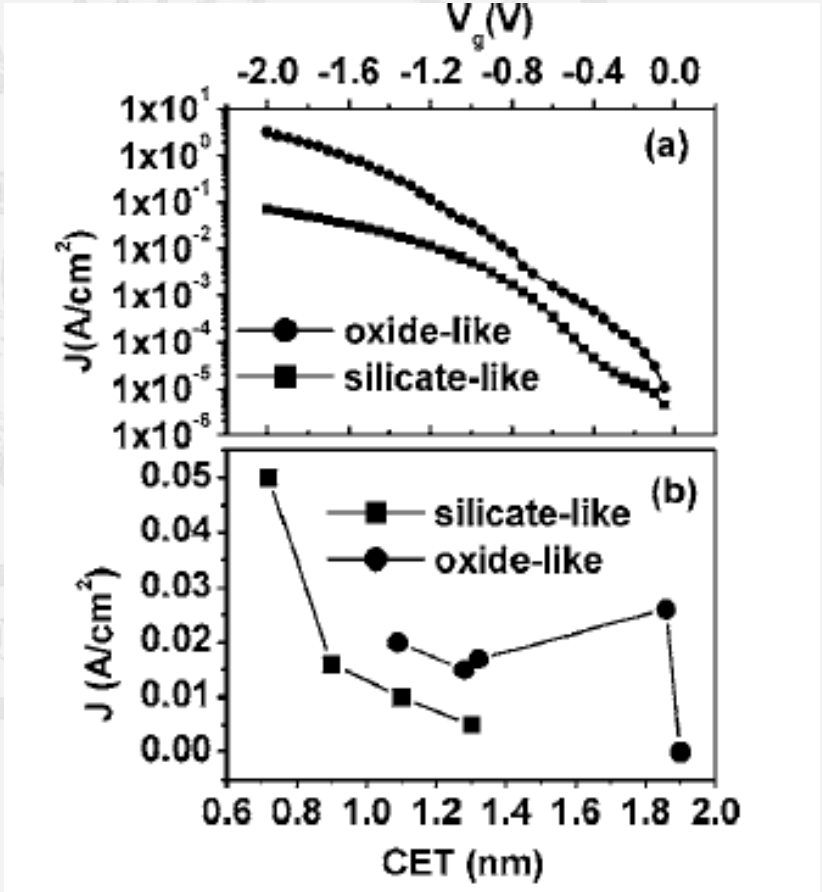


APPLIED PHYSICS LETTERS 90, 113508 (2007)

Influence of interface layer composition on the electrical properties of epitaxial Gd_2O_3 thin films for high-*K* application

Apurba Laha[a] and H. J. Osten[b]
Institute of Electronic Materials and Devices, Leibniz University of Hannover, Appelstr. 11A, D-30167 Hannover, Germany

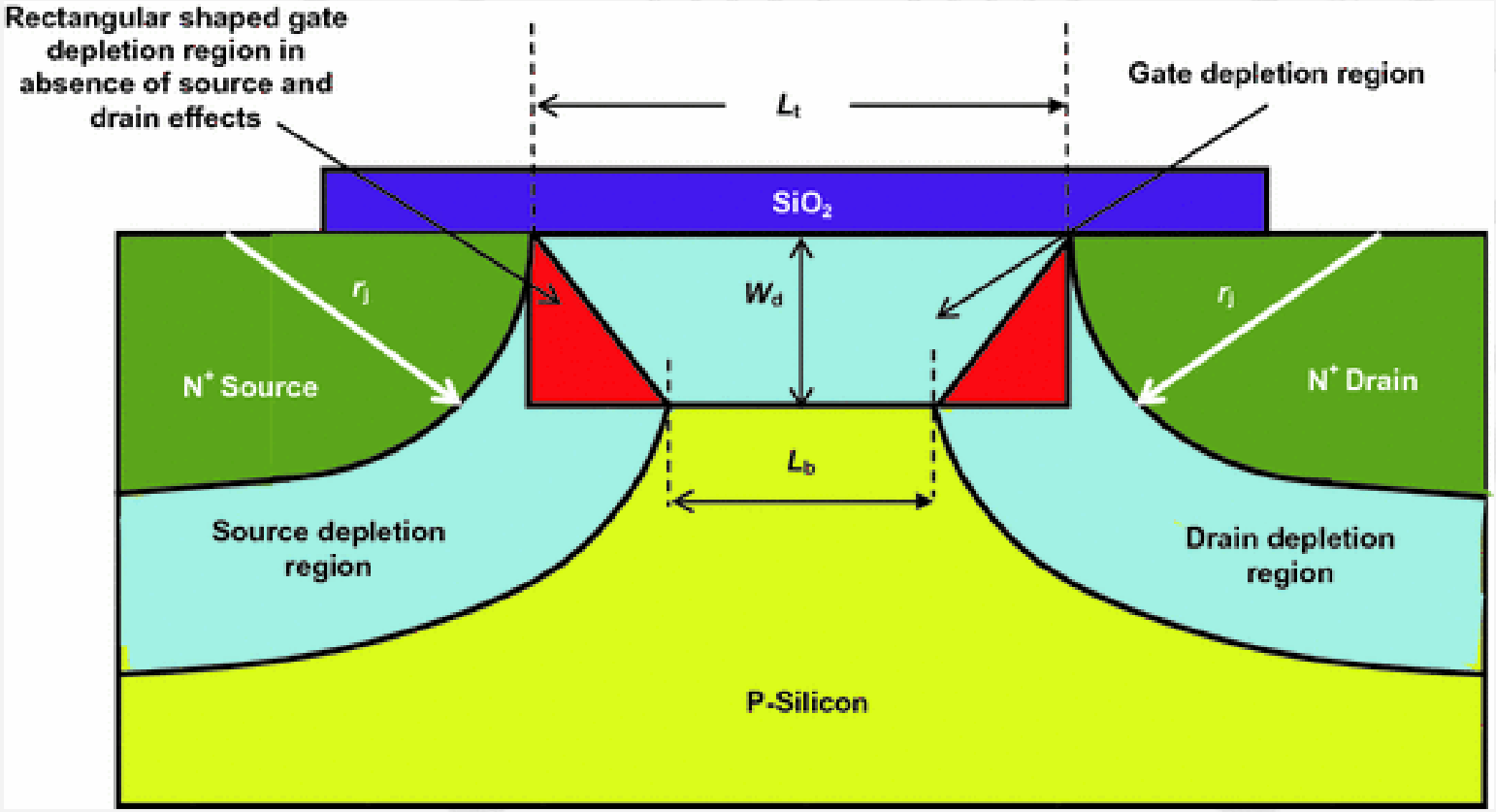




Short channel effect

Control of threshold voltage

$$I_D = \frac{\mu C_{ox}}{L_{ch}} (V_G - V_{th}^{*})^2$$



Short Channel Effect: V_{th} Roll-off

$$V_{th} = 2\phi_F - \frac{Q_B}{C_{ox}} = 2\phi_F + \frac{qN_A W_T}{C_{ox}}$$