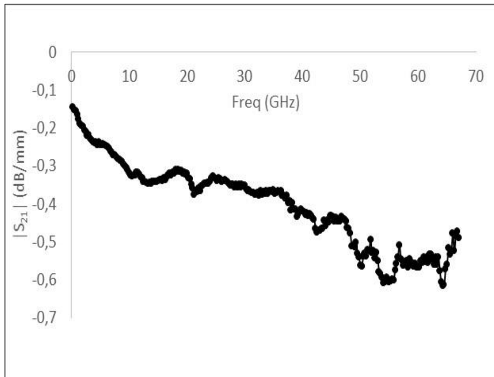
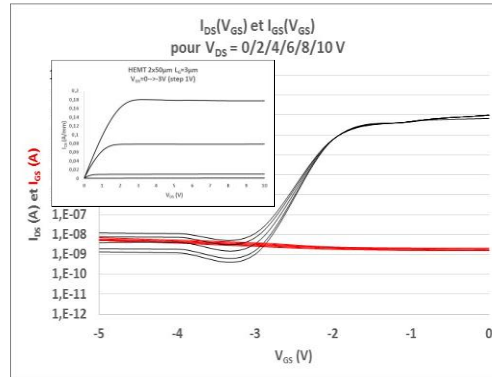
GaN RF HEMT structures grown by MOCVD on CVD 3C-SiC/Si





Left: *RF propagation losses measured on co-planar wave guides fabricated on GaN-on-3C-SiC/Si buffer.*

Right: *DC transfer and output characteristics of a transistor fabricated with a GaN HEMT on 3C-SiC/Si.*

(Process and device characterizations performed at IEMN).

CVD templates for low cost GaN RF circuits

Volume production of high performance GaN high electron mobility transistor (HEMT) heterostructures on large diameter substrates is a key point for the large scale development of high frequency telecommunications like 5G. In spite of large availability of low cost Silicon substrates, the high surface reactivity and the large mismatch in crystal lattice parameter and thermal expansion coefficient with GaN make the growth tricky. An original solution to overcome these difficulties has been developed with techniques recognized as suitable for the epitaxy at industrial scale. Cubic Silicon Carbide (3C-SiC) templates grown by CVD on high resistivity Silicon with diameter up to 100 mm have enabled the MOCVD epitaxy of AlGaN/GaN structures with high resistivity buffer inducing low RF propagation losses and compatible with the fabrication of transistors.

Breakthroughs

Low RF propagation losses (0,4-0,8 dB/mm at 40 GHz) in a GaN HEMT compatible buffer layers grown by MOCVD on 3C-SiC/Si.

Perspectives

Fabrication of RF circuits with GaN HEMTs on Silicon.

Collaborations : NOVASiC, IEMN

More information : http://www.crhea.cnrs.fr/GoSiMP/

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