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Emergent Property Sets & Applications of Beta-Gallium Oxide

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Recently, there has been a surge in interest for the wide bandgap ($E_g \sim 4.9$ eV) semiconductor gallium oxide (Ga_2O_3). A key driver for this boom is that single crystal wide area bulk β - Ga_2O_3 substrates have become commercially available [1] and a variety of methods have been shown to give high quality epitaxial growth [2,3].

Although Ga_2O_3 has a number of polymorph forms (α -, β -, γ -, δ - and ϵ) the more stable monoclinic phase (β - Ga_2O_3) has attracted the most attention. Amongst a whole range of potential applications power electronics, solar-blind photodetectors and UVC transparent electrodes offer exciting perspectives [3-5].

In this talk we give an overview of these applications illustrated with examples from the β - Ga_2O_3 development work carried out at the French oxide epiwafer start-up, Nanovation [4-7].

[1] <http://www.tamura-ss.co.jp/en/products/gao/index.html>

[2] <http://nanovation.com/en/products/>

[3] M. Razeghi, D. J. Rogers et al. Proc. SPIE 15330 (2018) 15330 O R-1

[4] D. J. Rogers et al. Proc. SPIE 15330 (2018) 15330 O R-1

[5] A. Perez-Tomas, D. J. Rogers et al. Proc. SPIE 15330 (2018) 15330 1 Q-1

[6] F. H. Teherani, D. J. Rogers et al. Proc. SPIE 10105 (2017) 10105 1 P-1

[7] E. Chikoidze et al. Materials Today Physics 3 (2017) 118

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