Ga_2O_3 and related Ultra Wide Band Gap materials for Energy Electronics

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Currently, a significant portion (~50%) of the global warming emissions such as CO_2 are related to energy production and transportation. As most energy usage will be electrical (as well as transportation), the efficient management of electrical power is thus central to achieve the XXI century climatic goals. Ultra-wide bandgap (UWBG) semiconductors are at the very frontier of the electronics for energy management or *energy electronics*.

A new generation of UWBG semiconductors will open new territories for **higher power rated power electronics** and **solar-blind deeper ultraviolet optoelectronics**. Gallium oxide - Ga_2O_3 (4.5-4.9 eV), has recently emerged pushing the limits set by more conventional WBG (~3 eV) materials such as SiC & GaN as well as for transparent conducting oxides (TCO) like In_2O_3, ZnO and SnO_2. Indeed, Ga_2O_3 as the first oxide used as a semiconductor for power electronics, has sparked an interest in oxide semiconductors to be investigated. While another UWBG $ZnGa_2O_4$ (~5 eV) enables spinel bipolar energy electronics for the first time ever. It the talk will be reviewed the state-of-the-art and prospects of these two materials and some recent experimental achievements in elaboration of high quality $ZnGa_2O_4$ and Ga_2O_3 epilayers and related electronic properties.