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NEW ALLOY SYSTEM BASED ON CORUNDUM STRUCTURED OXIDES FABRICATED BY MIST-CVD TECHNIQUE

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Innovative electric devices have been derived from new alloy systems for example AlAs-GaAs-InAs, AlP-GaP-AlAs-GaAs and AlN-GaN-InN. These alloy systems are consisted of binary compounds of same crystal structure and small lattice mismatches among them. We will propose a new alloy system based on corundum structured crystals: α - Al_2O_3 , Ga_2O_3 , In_2O_3 , Fe_2O_3 , Cr_2O_3 , V_2O_3 , Ti_2O_3 , and Rh_2O_3 . The optical band gap can be tuned from 3.7 to 9.0 eV by making of Al_2O_3 - Ga_2O_3 - In_2O_3 alloy. On the other hand transition metal oxides have many physical functions. Fe_2O_3 is a weak-ferromagnetism, Cr_2O_3 is a Mott insulator showing magnetoelectric effect, V_2O_3 and Ti_2O_3 showing metal-to-insulator transition and metal-to-semiconductor transition, respectively. Rh_2O_3 is not only showing electrochromic but also p-type semiconductor with a band gap of 1.2 eV. These can provide many physical functions to the alloy system

of Al_2O_3 - Ga_2O_3 - In_2O_3 . In this seminar, I will talk about this new alloy system and the new fabrication method of Mist-CVD technique which was originally developed by our laboratory.