Progress in Science and Application of Transparent Oxide Semiconductors

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Two decades have passed since the first TCM conference. Transparent contact represented by ITO was only the major function for application before 2 decades. During the past 2 decades, distinct progress has been made both in science and application. The representative progress is seen in transparent oxide semiconductor in which Fermi level is controllable. Many n-type new materials are reported and carrier doping may be understood by computational approach For device application, oxide TFTs has grown to a hot topic in electronics. IGZO-TFTs are now widely used as the switching transistor of flat panel displays. Further oxide TFTs are attracting attention for memory application utilizing extremely low-off current.[1,2]

In his talk, I mainly introduce the progress in our research on transparent oxide semiconductors (Fig.1) along with current challenges:

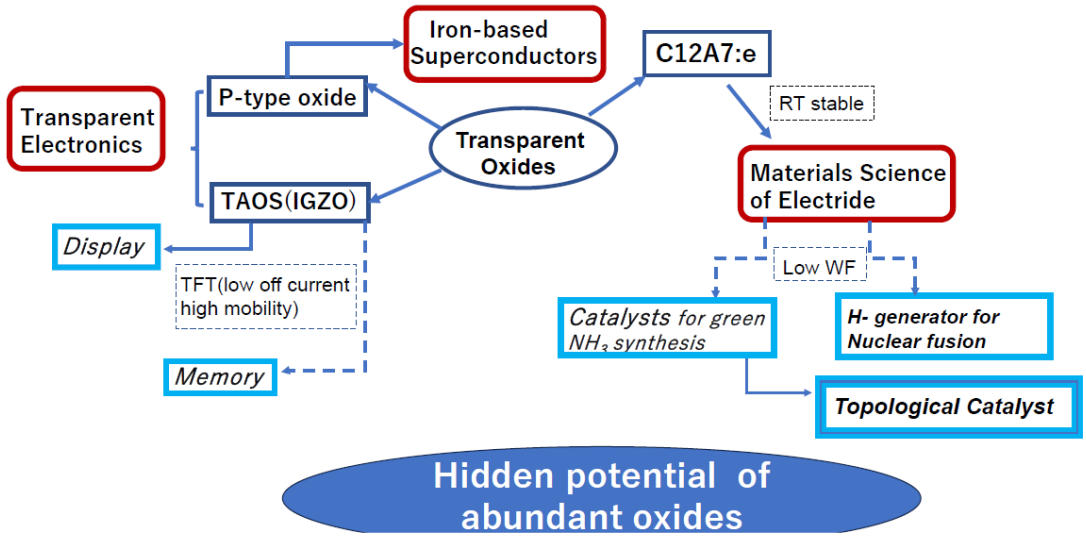

Fig.1 Frontier opened from transparent oxide research

1) Hosono and Kumomi (edited) Amorphous Oxide Semiconductors: IGZO and Related Materials for Display and Memory, Wiley 2022.
2) Kuo, Hosono, Shur and Jiang, Oxide Thin Film Transistors, Wiley, 2024