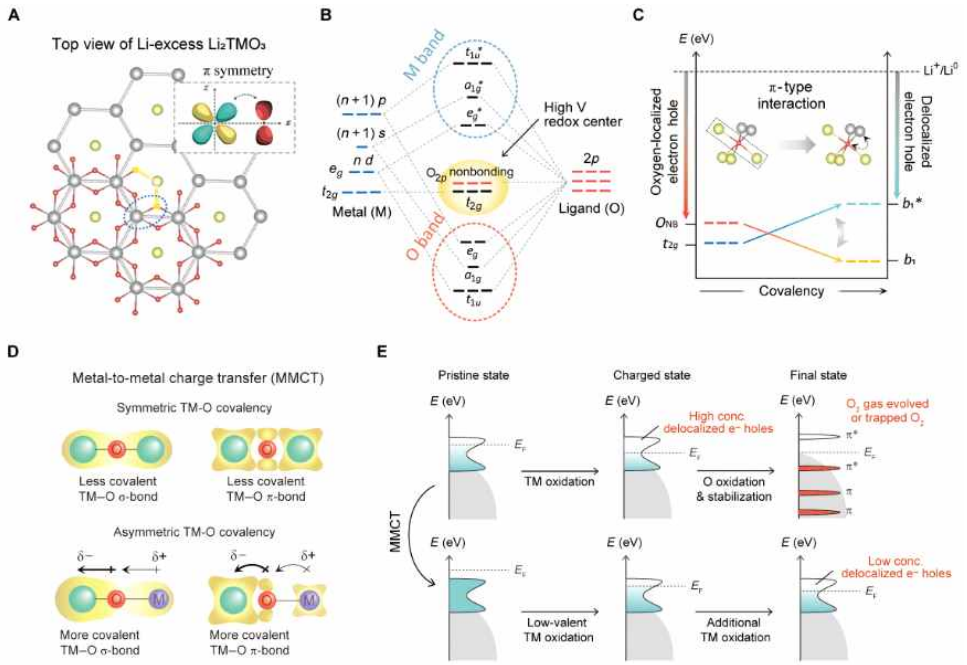
붙임2 **Research Outcomes Report**

Research Outcomes	Stabilization of High-Voltage Redox Chemistry in Lithium-Rich Cathodes via Metal-to-Metal Charge Transfer
Performance Objectives	Published in a Top 10% JCR Journal
Type of Performance	☑ Research Article(Paper) ☐ Patents ☐ Researcher Exchange ☐ Researcher Engagement ☐ Information Exchange ☐ Others
Desciption of Performance Type	Published in ***Science Advances*** (JCR top 8.2%)
Research Institutes	Korea Advanced Institute of Science and Technology (KAIST) / Prof. Dong-Hwa Seo / Eunryeol Lee et al. (15 others)
Attachments (Image, Photograph, Ect.)	 <Band structure of Li-rich oxides and their proposed anionic redox chemistry>
Achievement Date	2025.02.19
Summary of Performance	- A metal-to-metal charge transfer strategy using electropositive dopants stabilizes high-voltage redox in lithium-rich cathodes by mitigating oxygen release and structural instability. - Published in Science Advances, a prestigious journal ranked in the top 8.2% according to JCR.
Description of Performance	■ **Key Features** Incorporation of electropositive transition metals (Mn, Co, Ni) promotes metal-to-metal charge transfer within the Ru–O–TM framework, increasing electron density around Ru and preventing its transition to unstable high oxidation states. ■ **Performance** - The Ni-substituted sample (LRO-Ni22) delivered a charge capacity of 262.2 mAh/g, exceeding the theoretical value (227.1 mAh/g). - Maintained 92.5% of its capacity after 50 cycles at 60°C. - Oxygen gas evolution was reduced by 77% compared to the undoped sample. ■ **Excellence of the Results** The proposed strategy significantly mitigates key issues in Li_2RuO_3-based cathodes—such as oxygen redox-induced gas evolution, structural collapse, and voltage hysteresis—leading to enhanced electrochemical stability and cycle life. ■ **Uniqueness of the Results** Unlike previous approaches relying on structural control or additive engineering, this work introduces a fundamental electronic structure regulation strategy through metal-to-metal charge transfer, demonstrating high-voltage stabilization of lithium-rich cathodes.