

Developed technology

YU-FIC

Flexible OLEDs on Ultra-thin Glass

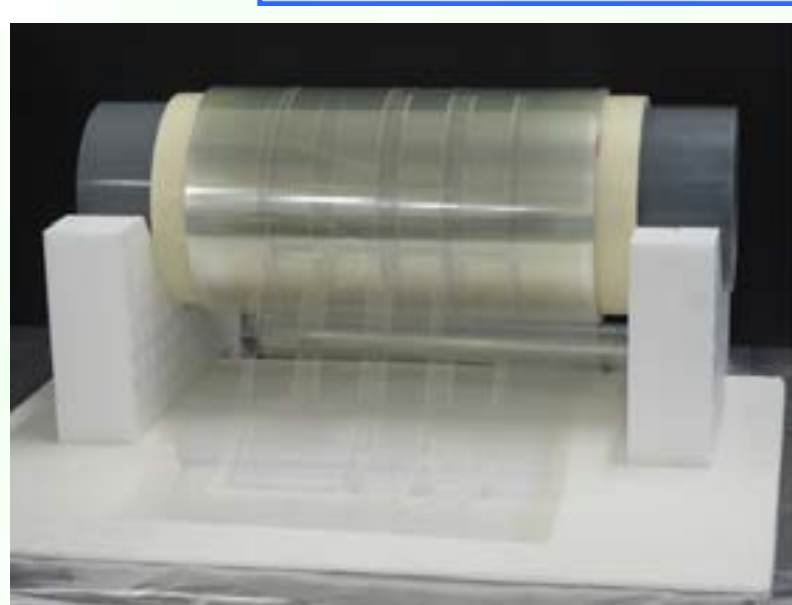
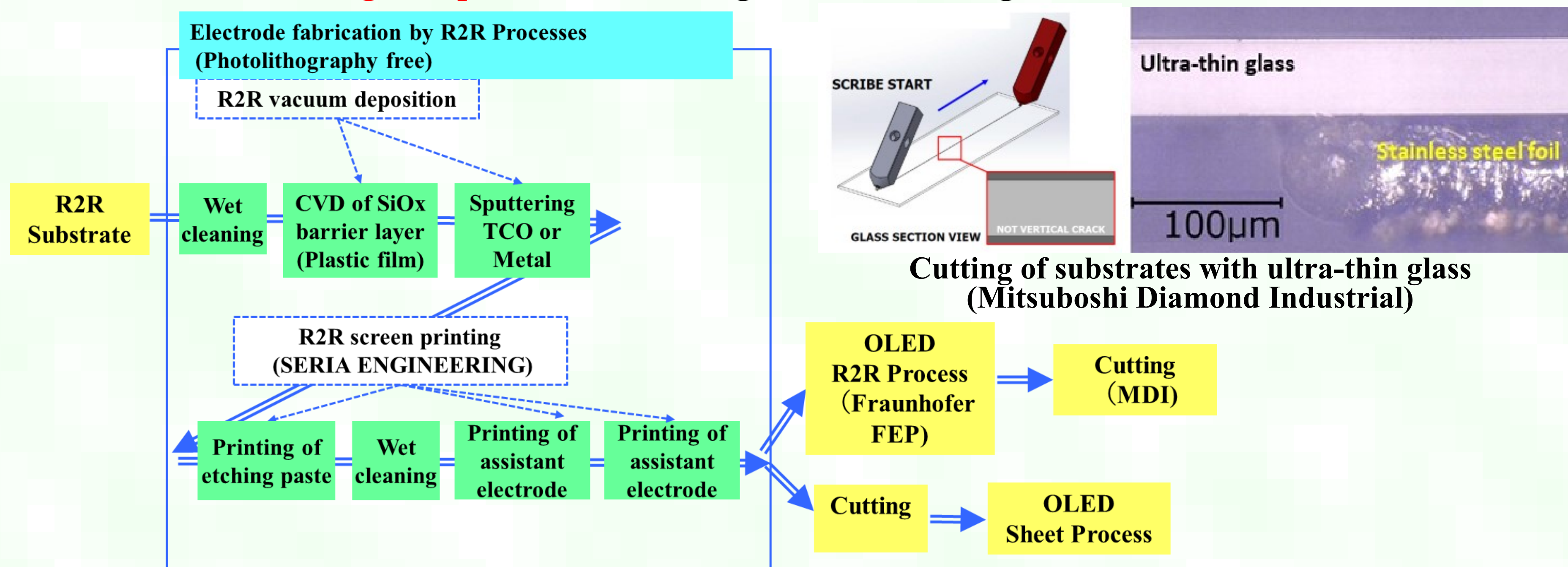
We develop flexible OLED lighting devices on **ultra-thin glass** with electrodes fabricated by roll-to-roll (R2R) technologies.

Technological features

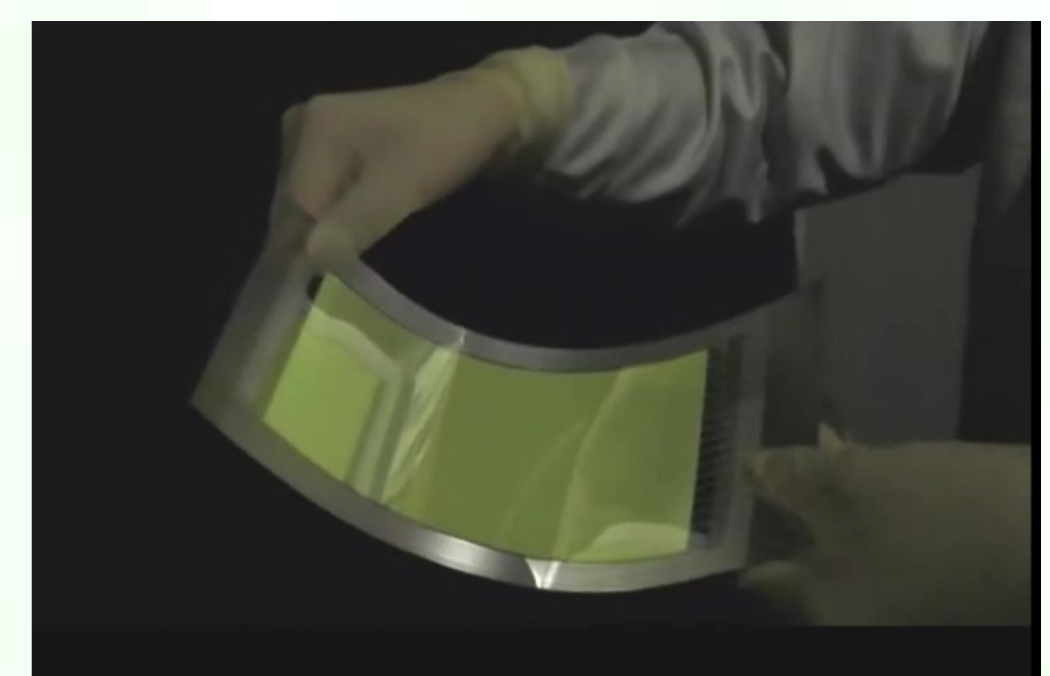
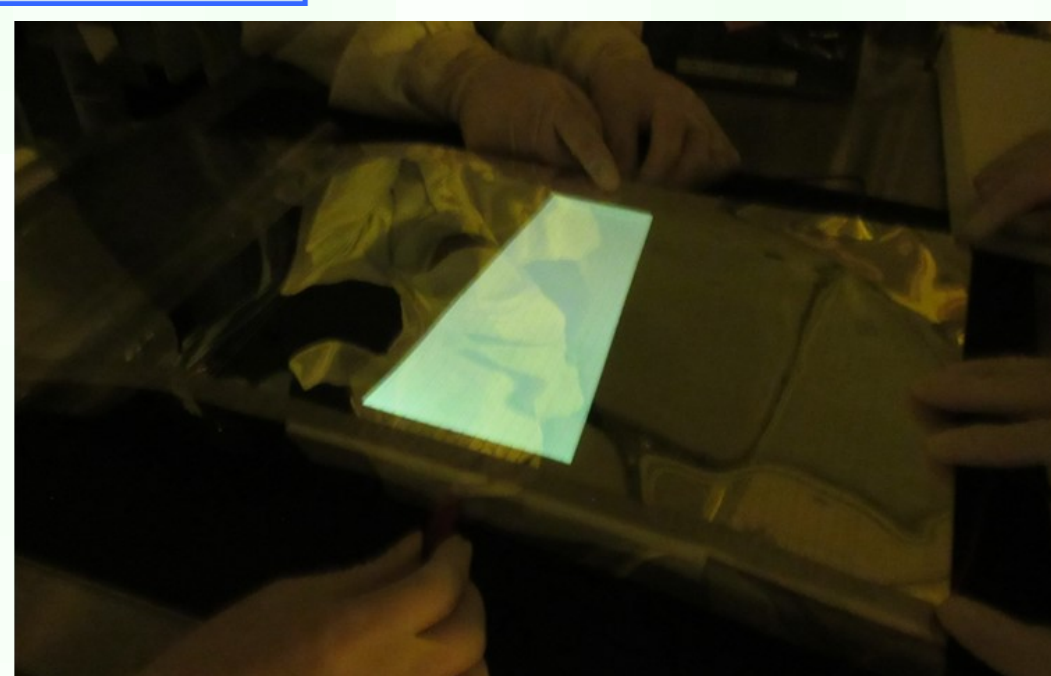
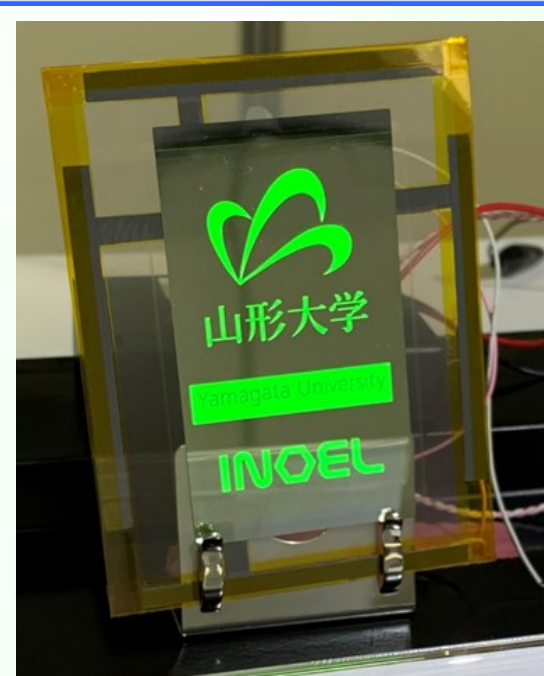
- Advantages of **ultra-thin glass G-Leaf®** of Nippon Electric Glass
 - Flexibility due to the thickness of **50μm**; Applicability to **Roll-to-roll (R2R)** fabrication
 - Intrinsic advantages of glass
(High gas barrier, surface smoothness, temperature stability, chemical stability, size stability, etc.)

Developed technologies

- Flexible OLED devices on ultra-thin glass with the thickness of 50μm.
 - Roll-to-roll (R2R) photolithography-free** fabrication of electrodes
 - Unique glass cutting** technology giving no damage to OLED devices with ultra-thin glass
 - Flexible laminating encapsulation** matching with ultra-thin glass



Ultra-thin glass with patterned electrodes (Nippon Electric Glass)



Collaboration

Fraunhofer FEP, Nippon Electric Glass Co., Ltd., SERIA ENGINEERING, INC., FEBACS CO., LTD., Mitsubishi Diamond Industrial Co., Ltd., NIPPON STEEL Chemical & Material Co., Ltd., FUJIKURA KASEI CO., LTD., Taica Corporation, tesa tape K.K.

Related program

- Yamagata University Flexible Electronics Japan-Germany International Collaborative Practical Utilization Consortium (YU-FIC) [Oct. 2017~Mar. 2023].
- JST: OPERA Program Grant Number JPMOP1614 [FY2016~FY2020].
- MEXT: Construction Program of Open Innovation Organization [FY2018~FY2022].

Publication

- T. Furukawa, M. Koden, IEICE Trans. Electron, E100-C, 949 (2017). "Novel roll-to-roll deposition and patterning of ITO on ultra-thin glass for flexible OLEDs"
- T. Furukawa, J. Hauptmann, T. Nakagaki, R. Ikeuchi, M. Sagawa, D. Nagata, J. Nakatsuka, IDW'21, FLX5/FMC6-1 (2021). "Roll-to-Roll Fabrication for OLED Lighting Using Ultra-Thin Glass Substrate and Encapsulating Stainless Steel Foil"
- T. Nakagaki, T. Kawabata, H. Takimoto, T. Furukawa, IDW'19, FLXp1-9L (2019). "Scribing Tool and Cutting Method for Ultra-thin Glass"
- T. Furukawa, K. Mitsugi, S. Akiyama, H. Itoh, D. Kobayashi, T. Suzuki, H. Kuroiwa, M. Sakakibara, K. Tanaka, M. Kawamura, M. Koden, IDW'14, FLX3-4 (2014). "Patterned ITO Film by Roll-to-Roll Process on Ultra-thin Glass"