

Developed
technology

YU-FIC

Roll-to-Roll (R2R) Fabrication of Barrier Film with Transparent Electrode

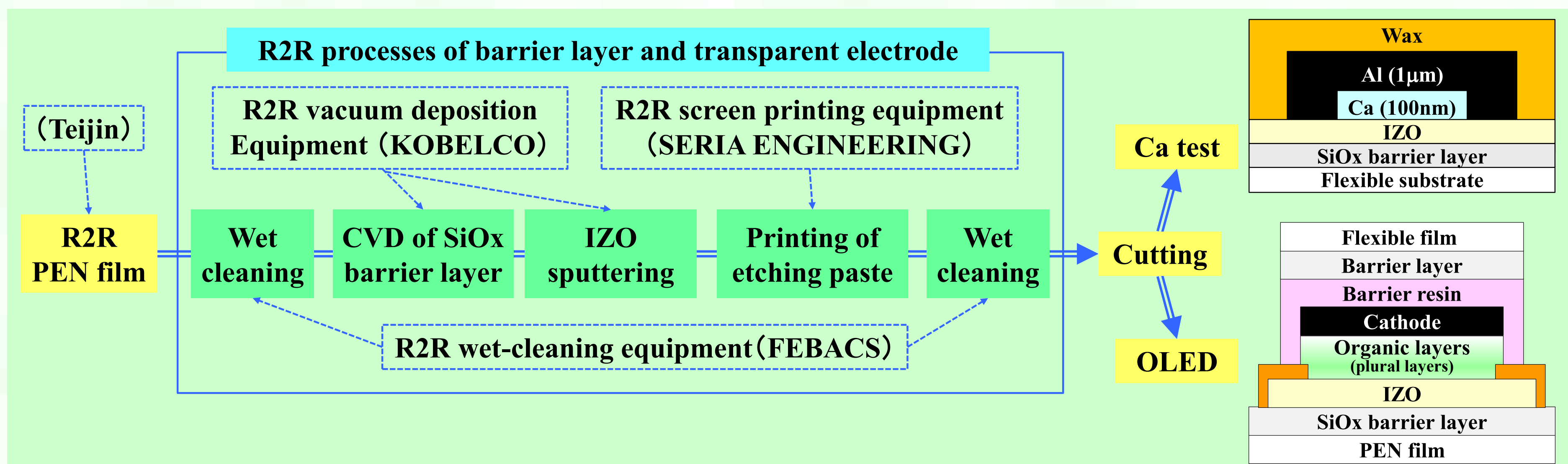
We develop fabrication technologies of gas barrier layer and transparent electrode on flexible films, using **roll-to-roll (R2R) depositions**, which are **PE-CVD (Plasma Enhanced Chemical Vapor Deposition)** and **sputtering**.

Technological features

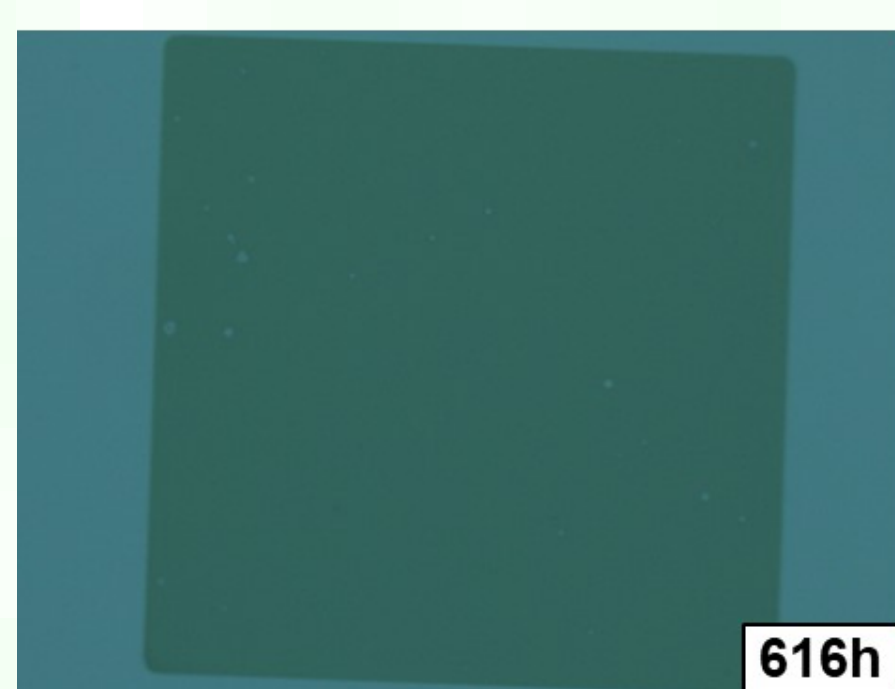
- Roll-to-roll (R2R) PE-CVD deposition of gas barrier layer on flexible films
- High barrier ability with WVTR (Water Vapor Transmission Rate) of the order of $10^{-6}\text{g/m}^2/\text{day}$
- **High gas barrier films with transparent electrode**

Developed technologies

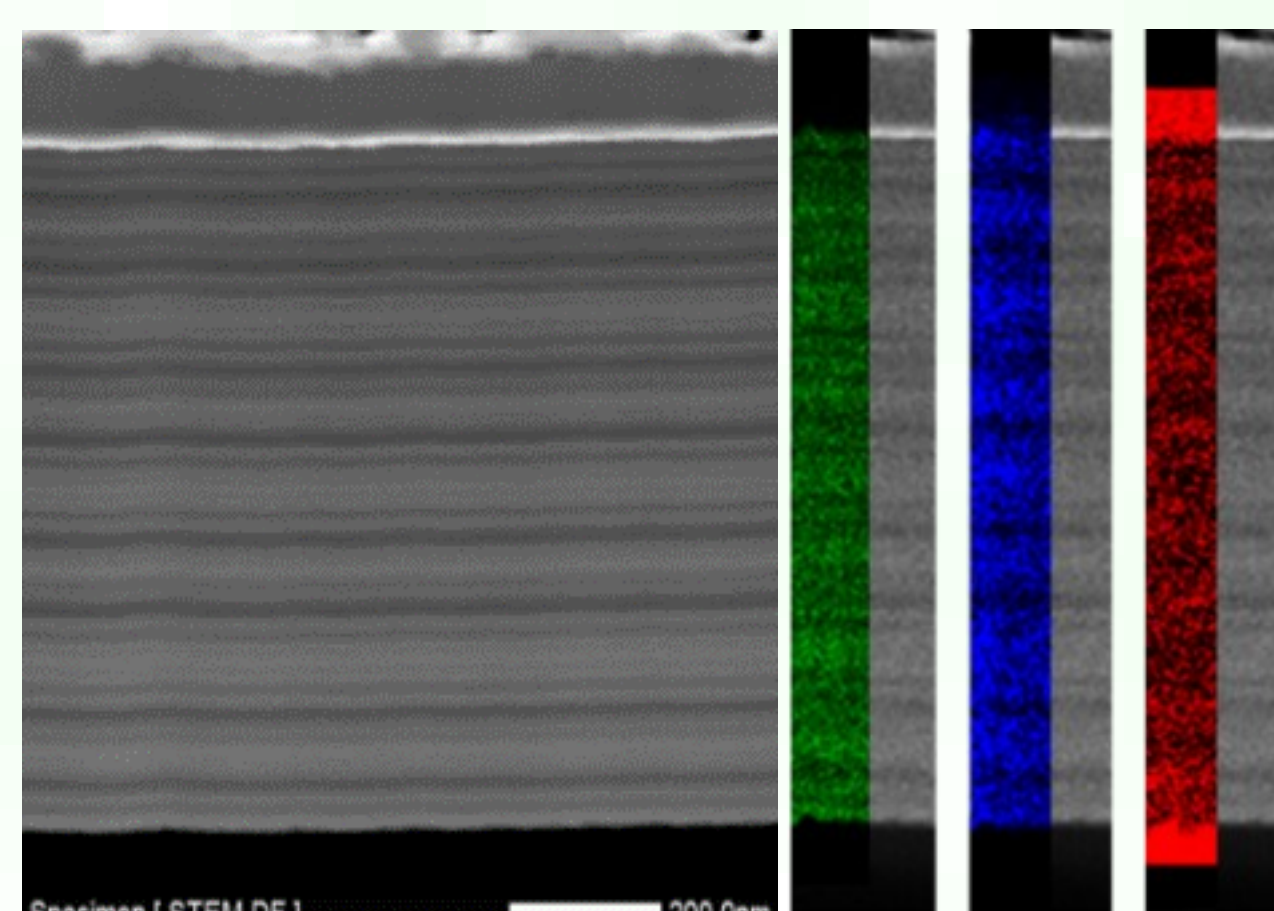
- **Roll-to-roll (R2R) photolithography-free** fabrication of barrier layer and transparent electrode on flexible films



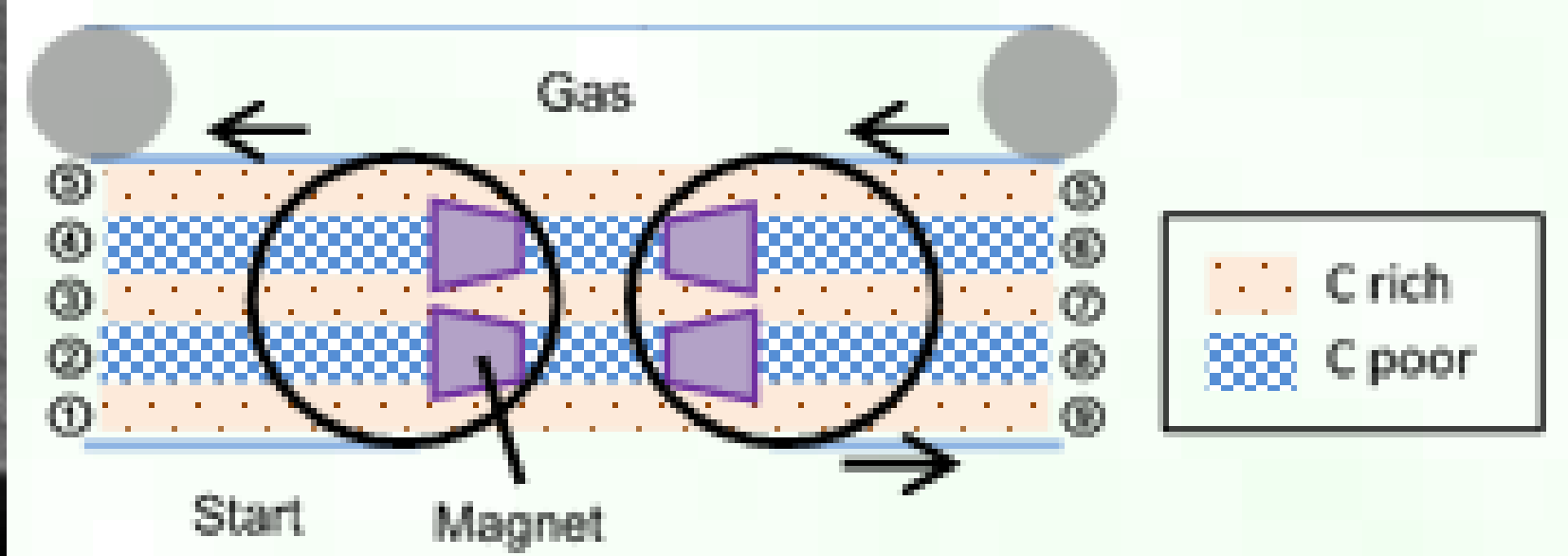
- High gas barrier property: $\text{WVTR} = 6.3 \times 10^{-6}\text{g/m}^2/\text{day}$



Ca corrosion device after 616 hours under 40°C/90%RH (Thickness of barrier layer: 720nm)



Cross section of barrier layer



CVD deposition mechanism

Collaboration

TEIJIN LIMITED, Tosoh Corporation, MORESCO Corporation

Related program

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

Publication

- K. Taira, Taiga Suzuki, W. Konno, H Chiba, H. Itoh, M. Koden, T. Takahashi, T. Furukawa, IDW'18, FLX2-4L (2018). "Development of High Gas Barrier Film Using Novel Precursor by Roll to Roll PECVD"
- T. Suzuki, W. Konno, K. Taira, H Chiba, H. Itoh, M. Koden, T. Takahashi, T. Furukawa, IDW'18, FLXp1-10L (2018). "High Gas Barrier Films with Heterogeneous Multilayer"
- K. Taira, T. Furukawa, N. Kawamura, M. Koden, T. Takahashi, IDW'17, FLXp1-8L (2017). "High gas barrier film for OLED"
- T. Furukawa, N. Kawamura, M. Koden, H. Itoh, H. Kuroiwa, K. Nagai, LOPEC (2017). "Gas Barrier Film for OLED Devices"