

Localized Induction Heating for Low Melting Point Alloy and Epoxy Mixture Encapsulation of OLED

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OLED is a potential next generation display technology, which has advantages of light weight, ultra-thin thickness, wide visual angle and quick response. But the organic light-emitting material is sensitive to the oxygen and water vapor[1], the encapsulation requires water vapor transmission rate(WVTR) and oxygen transmission rate(OTR) as lower as 10^{-6} g/(m²·d) and 10^{-5} cm³/(m²·d) respectively[2]. For this reason the low melting point alloy(LMPA) is applied in the OLED encapsulation. The multi-barrier structure of LMPA and epoxy provides excellent hermeticity for the encapsulation of OLED. However, it demands more research on the heating process of the LMPA to protect the OLED device from the thermal damage.

We introduce a new way to heat the LMPA and epoxy mixture locally. The induction heating has the characteristics such as non-contact, time saving and selective heating. In this case, we can proceed the sealing in a short time without contacting or heating the OLED device. We manufacture the high frequency AC power supply depending on the ZVC-circuit, whose frequency can reach 250 kHz. We measure the sealing temperatures of the LMPA barriers and the OLED device area. It shows that the LMPA melts in a short time and the OLED device's temperature is far behind the limited temperature. As a result, the induction heating is convenient, fast and safe heating method and it is a ideal for the OLED sealing with LMPA.

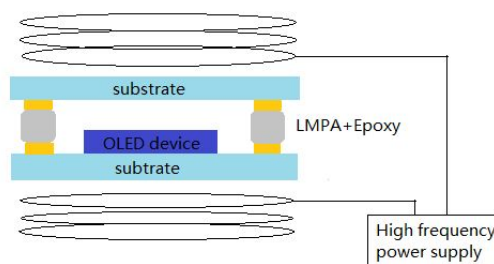


Fig. 1. Induction heating fabrication

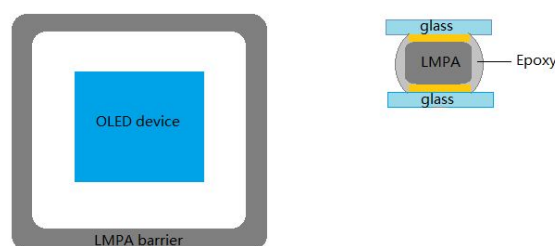


Fig. 2. The top view of test pattern and the sectional view of the LMPA-Epoxy structure

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References

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