

Fig.1 Image of ZnO Si/SiO₂ FET Test Pattern

Zinc Oxide semiconductor

ZnO is a wide band semiconductor which offers the possibility to become the most convenient material for the development of oxide based electronics and optoelectronics. The crucial parameter for making it a perfect material for flexible optoelectronics is the possibility to deposit it at room temperature (RT). Ablation by the Pulsed Plasma Deposition (PPD) developed by Organic Spintronics (OS) allows to fabricate thin films at RT. The PPD grown ZnO shows low carrier density 10^{-16} cm³ and large Hall mobility up to 10^3 cm²/Vs (Fig.4) and the absence of green emission (see the PL spectrum in Fig.3). We have fabricated preliminary FET pattern structures obtaining good electrical FET response (Fig. 2) and FET mobility of 1 cm²/Vs and 10^5 ON/OFF ratio.

Typical characteristics are:

Visible Transmittance T%	Hall Mobility cm ² /Vs	Roughness nm r.m.s.	Deposition rate Gun III (20Hz) nm/min	Deposition rate Gun IV (100Hz) nm/min
Up to 90	Up to 1000	3.1 ± 0.5	3	100

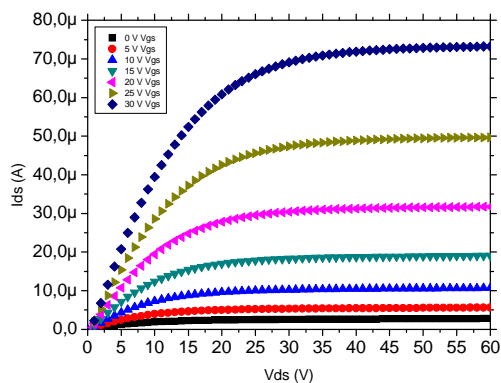


Fig. 2 Output curve ZnO-FET

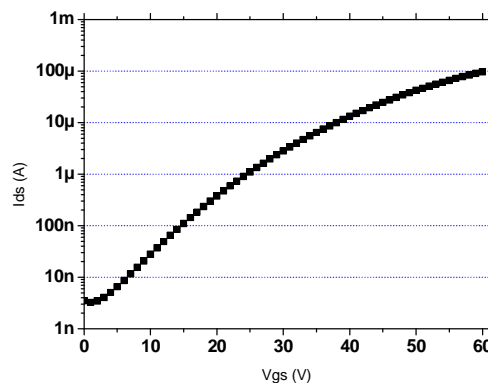


Fig.3 Transfer curve of ZnO-FET

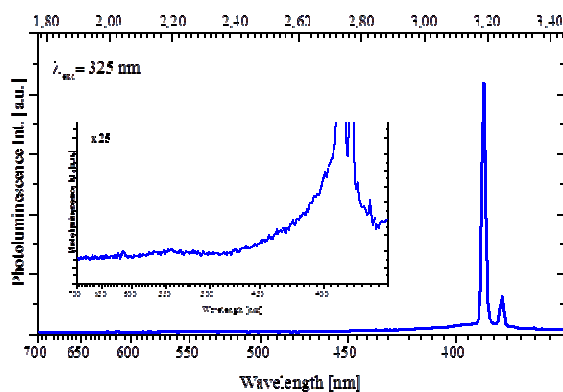


Fig. 4 ZnO photoluminescence

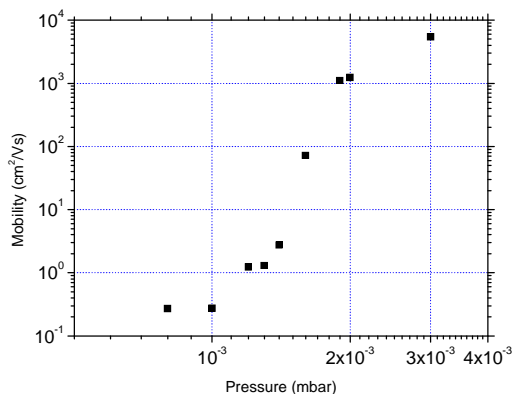


Fig.5 ZnO Hall mobility at room temperature vs PPD dep.parameters