

Single walled carbon nanotubes to replace Indium in touch sensors

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Rare metals have high socio-economical and technological importance, while being prone to supply-demand fluctuations. Indium is currently used in wide variety of consumer electronics devices, such as in displays as well as in touch screens of mobile phones and ipad-style portable computers. In order to replace indium, which is the typical rare metal heavily used for transparent conductive films (TCF), we are developing single-walled carbon nanotubes (SWCNT). We report recent studies on the synthesis of high quality single walled carbon nanotubes with a ferrocene-based floating catalyst CVD reactor and show that SWCNT networks consisting of long, clean and highly individualized SWNTs exhibit substantially improved TCF performance. In addition, we used our novel FC-CVD reactor based on spark discharge catalyst generation to experimentally study the effect of bundling on the performance of TCF and thin film transistors (TFT). The synthesis of SWCNTs relies on generation of iron catalyst particles in the diameter range of 4 ± 3 nm with precisely tunable concentration into nitrogen carrier gas with a spark generator, allowing to grow individual and high-quality SWCNTs from CO with well-defined diameter and length distributions. Network thin film field effect transistors(TFT-FET) of individual SWCNTs exhibit higher uniformity in terms of both mobility and ON/OFF ratio compared to larger bundles.