

model in the 0.2~2.0 THz band. For nanowhiskers 418nm and 698nm in heights, the plasma frequencies are 864 versus 920 rad·THz, and carrier scattering time are 60 versus 69 fs, respectively. The carrier mobility, carrier concentration are also determined to be 2 versus 26 $\text{cm}^2\text{V}^{-1}\text{s}^{-1}$, 7 versus $8 \times 10^{19} \text{ cm}^{-3}$, respectively. Our results indicate that the ITO nanowhiskers and its bottom layer atop the substrate exhibit longer carrier scattering times than ITO thin films. This signifies that ITO nanowhiskers have an excellent crystallinity with large grain size, consistent with X-ray data. Besides, the expectation value of cosine of scattering angle is ($\gamma \sim -0.96$). This indicates a strong backscattering effect and fully carrier localization in the ITO nanowhiskers. Thus ITO nanowhiskers are attractive for THz device applications, in addition to its broad interests for the visible spectral range.

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