Polymer organic light emitting diodes (OLEDs) were fabricated using thin silver hexagonal grids replacing indium tin oxide (ITO) as the transparent conducting electrodes (TCE). Previous literature has assumed that thick metal grids (several hundred nanometres thick) with a lower sheet resistance (<10 Ω/sq) and a similar light transmission (>80%) compared to thinner grids would lead to OLEDs with better performance than when thinner metal grid lines are used. This assumption is critically examined using OLEDs on various metal grids with different thicknesses and studying their performances. The experimental results show that a 20 nm thick silver grid TCE resulted in more efficient OLEDs with higher luminance (10 cd/A and 1460 cd/m² at 6.5 V) than a 111 nm thick silver grid TCE (5 cd/A and 159 cd/m² at 6.5 V). Furthermore, the 20 nm thick silver grid OLED has a higher luminous efficiency than the ITO OLED (6 cd/A and 1540 cd/m² at 6.5 V) at low voltages. The data shows that thinner metal grid TCEs (about 20 nm) make the most efficient OLEDs, contrary to previous expectations. © 2014 Elsevier B.V. All rights reserved.