Five-ring hollow-core photonic crystal fiber with 1.8 dB/km loss

A 19-cell hollow-core photonic crystal fiber reaching 1.8 ± 0.5 dB/km loss at 1530 nm is reported. Despite expanded corner holes in the first ring adjacent to the core, and only five cladding rings, the minimum loss is close to the previously published record of 1.7 dB/km at a comparable wavelength, achieved in a fiber with seven cladding rings. Since each additional cladding ring requires a significant increase in fabrication time and complexity, it is highly desirable to use as few as possible while still achieving low loss. Modeling results confirm that further reducing cladding deformations would yield only a small decrease in loss. This demonstrates that loss comparable to the previously demonstrated lowest-loss bandgap fibers can be achieved with fiber structures that are significantly simpler and faster to fabricate. © 2013 Optical Society of America.