135
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Abstract:We show that chalcogenide glass As38Se62 capillaries can act as efficient waveguides in the whole midinfrared-terahertz (THz) spectral range. The capillaries are fabricated using a double crucible drawing technique. This technique allows to produce glass capillaries with wall thicknesses in the range of 12 to 130 μm. Such capillaries show low-loss guidance in the whole mid-IR-THz spectral range. We demonstrate experimentally that low-loss guidance with thin capillaries involves various guidance mechanisms, including Fresnel reflections at the capillary inner walls, resonant guidance (ARROW type) due to light interference in the thin capillary walls, as well as total internal reflection guidance where very thin capillary walls act as a subwavelength waveguide, which is especially easy to observe in the THz spectral range. © 2012 Optical Society of America.
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