A PARTIAL COUPLING POWER OF SINGLE MODE FIBER FUSION

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Abstract:

Coupled fibers are successfully fabricated by injecting hydrogen flow at 1 bar and fused slightly by unstable torch flame in the range of 800-1350C. Optical parameters may vary significantly over wide range physical properties. Coupling coefficient and refractive index are estimated from the experimental result of the coupling ratio distribution from 1% to 75%. The change of structural and geometrical fiber affects the normalized frequency (*V*) even for single mode fibers. Coupling ratio as a function of coupling coefficient and separation of fiber axis changes with respect to *V* at coupling region. *V* is derived from radius, wavelength and refractive index parameters. Parametric variations are performed on the left and right hand side of the coupling region. At the center of the coupling region *V* is assumed constant. A partial power is modeled and derived using *V*, normalized lateral phase constant (u), and normalized lateral attenuation constant, (*w*) through the second kind of modified Bessel function of the / order, which obeys the normal mode, LP_{01} and normalized propagation constant (*b*). Total power is maintained constant in order to comply with the energy conservation law. The power is integrated through *V*, u and *w* over the pulling length range of 7500-9500μm for 1-D where radial and angle directions are ignored. The core radius of fiber significantly affects *V* and power partially at coupling region rather than wavelength and refractive index of core and cladding. This model has power phenomena in transmission and reflection for industrial application of coupled fibers.