SBIR 06.2 PHASE I - AWARD DETAILS	
ORGANIZATION	CERDEC
TOPIC NUMBER	A06-120
CONTRACT NUMBER	
YEAR OF AWARD	
AWARD START DATE	
AWARD COMPLETION DATE	
PROPOSAL NUMBER	A062-120-0917
TITLE	High Efficiency Erbium/Ytterbium (Er/Yb) Doped Fibers for Eye-safe Fiber Laser Sources
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KEYWORDS	Er/Yb double clad fiber, fiber lasers, sol-gel, electrophoretic deposition, P co-doping
ABSTRACT	We propose a new process, distinct from conventional vapor deposition that overcomes limitations which plague current glass fabrication methods. Specifically, these limitations include level of co-dopant concentration, precision in control of dopant concentration and homogeneity, and size of core and cladding regions. These parameters are known to affect slope efficiency and other critical operating parameters of Er/Yb double clad fiber lasers. It is expected that this new process can achieve Er/Yb and co-dopant levels not normally achievable by vapor deposition and that these levels are required to achieve the required high slope efficiencies. This new process also allows precise control of refractive index critical for large core fibers. Amorphous nano-sized particles are prepared by a modified sol-gel process. These are subsequently deposited from an organic-slurry by electrophoresis to form the core and primary cladding of an optical fiber preform. Separation of the glass formation and deposition processes allows greater compositional diversity with precise dopant control, more homogeneous glass and increased quantity of core and cladding.
BENEFITS	This research will demonstrate the applicability of the hybrid sol-gel electrophoretic deposition process for making fiber performs possessing a wide range of precisely controlled glass compositions and core/clad dimensions. Commercialization of this process would enable production of the specified double clad Er/Yb fiber lasers with high efficiencies for Light Detection and Ranging (LIDAR), remote sensing, satellite communications, and many other applications, both military and commercial. The anticipated umiformity in rare earth and co-dopant composition and the ability to make preforms with a wider

	range of core/clad dimensions than conventional processing is expected to lead to applications in existing markets such as fiber amplifiers.