11-TTAG-024

Company Name	Mesolight LLC
NAICS	334413
Address	4607 W 61st St
City	Little Rock
State	AR
ZIP	72209
County	Pulaski
Number of Employees	7
Year Established	2005
Company Web Site	http://www.mesolight.com
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Project Area	Advanced Materials and Manufacturing Systems - 2 - Nanotechnology
Project Area Brief Description	Manufacturing Systems - 2 - Nanotechnology
Federal Agency	National Science Foundation
Project Title	11-TTAG-024 - Cadmium-free nanocrystals based light emitting diodes for full color flat panel displays
Competitive Challenges	Polymeric LED (PLED) has the superior imaging performance, compact, lightweight properties and versatile form factor cost-effective solution processability; and thus is setting to replace liquid crystal displays (LCDs) and cathode ray tubes (CRTs) in many existing applications, as well as open up exciting possibilities for new product forms and applications. However, PLED has the drawback of limited emitting colors, broad and red tailed emission peak, low efficiency, and short lifetime. This NSF SBIR Phase I project will develop cadmium free semiconductor nanocrystal-polymer composite light emitting diodes (LEDs) that have superior imaging performance, long lifetime, compact, and lightweight properties. In particular, the proposed hybrid PLEDs could produce 154% number of colors of NTSC standard color gamut, and thus reach the best ever color diversity and accuracy for visions. **The broader impact/commercial potential of this project** will be to enable more extensive use of PLEDs in various electronic devices, and replace current LCDs, which are less efficient, convert only 10% of electrical energy into light.
Specific Problem	The phase I section of this NSF SBIR project focus on the development of Cd-free nanocrystal based ultraviolet/blue emitting PLED. To do this, two technical objective need to be achieved: (1) development highly bright and stable ultraviolet/blue emitting Cd-free nanocrystals, and (2) fabrication of prototype of nanocrystal based LEDs. In the past several month, we have

	successfully accomplished the first objective --- we have developed violet emitting Cd-free nanocrystals with quantum efficiency (>50%) and high stabilities. We have strong expertise on the synthesis of nanocrystals, but not on the device fabrication. In particular, we lack advanced LED fabrication and characterization facility.
Solution	We will fabricate part of the devices in Prof. Jingbio Cui's lab (Department of Physics and Astronomy, UALR). Prof. Cui's research focuses on semiconductor nanostructures and their applications in optoelectronics and electronics at the nanometer scale, including nanowire light emitting diodes (LEDs). Prof. Cui's expertise on LED fabrication will be very helpful to this project, and the facilities (such as plasma cleaner, PVD system, etc.) in his lab can be directly used in the fabrication of the proposed PLEDs
Implementation Plan	Cd-free nanocrystal based LEDs will be fabricated and characherized in Prof. Cui's Lab.
Maintenance Plan	The prototype of violet/blue emitting LEDs to be developed will be included in the Phase I report, and Phase II and Phase IIB applications.
Step 1	Help Mesolight LLC to fabricate Cd-free nanocrystal based violet/blue emitting LEDs.
Step 1 Time	100.00
Step 1 Budget	$2,500
Step 2	Help Mesolight LLC to characterize the LEDs.
Step 2 Time	100.00
Step 2 Budget	$2,500
Step 3	
Step 3 Time	0.00
Step 3 Budget	$0
Increased Sales	$0
Retained Sales	$0

CS Inventory	$0
CS Labor	$0
CS Materials	$0
CS Other	$0
II Plant	$0
II IS	$0
II Workforce	$0
II Research	$1,000,000
II Other	$0
AUI	$0
SOI	$0
Job Retention	2
Job Creation	8
YN 90Days	No
YN Affiliation	No
YN Agreement	Yes
YN Total Project Price	Yes
Explain Total Project Price	
YN Cash Match Agreement	Yes
Copied	No
TTAG ID	11-TTAG-024
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Include in Batch	Yes
Batch Number	NA
Application Status	Pending
Organization	ASTA
BatchTest	Processed
Batch Date	
Set Batch Number	
Lvl4	No
Application Description	6-Advanced Materials & Production
SBIR-STTR	Yes