

AU researchers developing novel technology with Group4Lab

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Alfred University(AU) has been contracted to develop sacrificial substrates to support Gallium-nitride-on-Diamond technology to improve efficiencies in the lighting industry and advance the sensing and communication industries. A startup company, Group4 Labs, Inc. (Freemont, CA) has contracted with Alfred University (AU) researchers to develop a sacrificial substrate for diamond coatings. S.K. Sundaram and Scott Misture, who are Inamori Professors of materials science in the Kazuo Inamori School of Engineering at AU, will oversee the project. Misture and Sundaram are to develop a substrate material for Group4 Lab's novel technology which that combines diamond and semiconductors to extract heat rapidly, efficiently, passively, and cost-effectively (group4labs.com). The micron-sized diamond coating is first applied to a sacrificial substrate, according to Sundaram. When the sacrificial substrate is removed, the diamond coating will then serve as the substrate for further processing of the semiconductor coating. Once completed, this technology will be used in such applications as solid state lighting, sensing, and communication industries. Misture and Sundaram believe that cordierite glass-ceramics are most suitable as a diamond coating substrate because the two materials are well matched with regard to thermal expansion as well as chemical and thermal stability under the processing conditions of interest to Group4Labs, Inc. The "sacrificial" substrate must also be inexpensive because it is disposed of during processing. Previously, diamonds had been deposited on substrates with different thermal expansion coefficients, which resulted in "mis-match failure and thermal cracking," according to Misture. The main challenge is matching the thermal expansion coefficients of the substrate and the coating. Misture and Sundaram hope to accomplish that by manipulating the glass chemistry and controlling a specific crystal phase's crystallizing out.