Frontier Chemistry Center
フロンティア化学教育研究センター 講演会

演 題： **The Structural and Acid-Base Properties of Ion Beam Damaged Substrates and Implications for Growth Carbon Nanotube Carpets**

講 師： **Prof. Placidus B. Amama**
Kansas State University, the USA

日 時： 2015 年 7 月 7 日（火）13:00~14:00

場 所： フロンティア応用科学研究棟
セミナー室 1
Seminar Room 1,
Frontier Research in Applied Sciences Building

要 旨：

Some applications of carbon nanotube (CNT) carpets require carpets to be grown directly on specific substrates via CVD. Thus, there is significant interest in understanding the properties of a good catalyst substrate and how to create and maximize these features in inactive substrates. Our recent transformation of an inactive catalyst substrate (c-cut sapphire) to an active substrate for CNT carpet growth via ion beam bombardment provides a good model system for this study. The properties of pristine and ion beam damaged angle data have been analyzed using the van Oss-Good-Chaudhury model and the Young-Dupre equation, enabling the determination of the acid-base properties of the substrates. XRR has been used to probe the layer properties (density, thickness, cross-sectional layering, refractive index, and microscopic roughness). The results have enabled the establishment of substrate property-function relationships. Detailed discussion of the implications of these results in CNT carpet growth will be presented. The new insights gained from this study are expected to guide the design and modification of inactive catalyst substrates with the goal of broadening the substrates that can be used for the growth of high-quality CNT carpets.

References:
1. A.E. Islam, P. Nikolaev, P.B. Amama et al., *Nano Lett*. **2014**, 14, 4997.
2. P.B. Amama, S.A. Putnam, A.R. Barron, and B. Maruyama, *Nanoscale* **2013**, 5, 2642.
3. P.B. Amama, C.L. Pint, F. Mirri, et al., *Carbon* **2012**. 50. 2396.
4. P.B. Amama, C.L. Pint, S.M. Kim, et al., *ACS Nano* **2010**, 4, 895.

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