Postdoctoral Position at Stanford University for Studies of Nucleation and Growth in Atomic Layer Deposition

A postdoctoral research position is available in the laboratory of Professor Stacey Bent in the Department of Chemical Engineering at Stanford University. The position is available immediately to work on a project funded by the U.S. Department of Energy on studies of surface reaction mechanisms in atomic layer deposition using a combination of laboratory-based and synchrotron-based techniques. The position is expected to be for up to 2 years.

This research program carries out fundamental studies to elucidate molecular-level reaction mechanisms and nucleation processes active during atomic layer deposition (ALD). ALD is a materials synthesis technique that is drawing much attention for its ability to produce the precise, nanostructured materials needed in emerging energy conversion technologies. The ALD process consists of sequential, alternating pulses of gaseous chemical precursors that undergo a self-limiting reaction with a substrate, leading to the highly controllable deposition of films ranging from a single layer to tens of nanometers in thickness. To investigate ALD nucleation and growth mechanisms, the research will use a suite of both in situ and ex situ experimental tools complemented by theory. These experimental tools include in situ and in vacuo spectroscopies and x-ray scattering techniques, utilizing specialized experimental apparatus that the PI’s research group has built for performing both laboratory-based and synchrotron-based studies. The planned research will investigate three different ALD systems – 2D transition metal dichalcogenides, ternary metal oxides, and nucleation-enhancing surfaces – that are selected due to their technological relevance to materials such as transparent conductors, sensors, and catalysts, and to their ability to provide insight into key mechanistic themes prevalent across a number of ALD systems. The program will also develop and expand methodologies for in situ characterization of materials synthesis.

Qualifications:

- Ph.D. in physics, chemistry, chemical engineering, materials science or a related field.
- Experience with synchrotron x-ray scattering studies strongly preferred.
- Solid background in materials characterization and experience with design and development of in situ measurement systems desirable.
- Experience with atomic layer deposition, vacuum systems, surface infrared or electron spectroscopies, or other synchrotron measurements is a plus.
- Willingness to learn and bridge knowledge/experience gaps.
- Ability to work independently and in a team environment.
- Effective written and verbal communication skills.

Please send a letter with CV and list of publications, and names of two references, to the address below:

Stacey F. Bent, email: sbent@stanford.edu