报告题目：Simple and Cost-Effective Method for Preparing Crystalline

Semiconductor Nanomaterials and Thin Films with Liquid Metal Electrodes

报告人：Eli Fahrenkrug 博士，美国西北大学

报告时间：2016年9月30日 10:00-11:30，报告地点：图书馆101会议室

报告人简介：

Eli Fahrenkrug，博士。2016年于密歇根大学取得博士学

位。毕业后在西北大学从事研究员工作。美国国际纳米技术研究所会员。Eli Fahrenkrug博士主要从事电化学调控半导体晶体生长工作，开创了在液态金属中电化学晶体生长的新方法，制备了包括Ge、Si、GaAs、InAs和InSb及其异质结的纳米材料和薄膜；设计制备了大量的压缩式和高温电化学反应器，以满足半导体合成中对于宽谱温度和压力范围的需求；通过电化学TEM实现了晶体生长观测的可视化。以第一作者在JACS、Nano Lett.、Chem. Mat.、Acc. Chem. Res等国际期刊上发表论文多篇。

Abstract of Speech:

Crystalline covalent semiconductors are ubiquitous in society as backbones of many communications, energy, and sensing technologies. Current industrial manufacturing methods for groups IV and III-V semiconductors can be energy- and resource-intensive. This talk describes a new electrochemical synthetic strategy for direct growth of crystalline covalent groups IV and III–V semiconductor materials at or near ambient temperature conditions. This strategy, which we call “electrochemical liquid–liquid–solid” (ec-LLS) crystal growth, marries the semiconductor solvation properties of liquid metal melts with the utility and simplicity of conventional electrodeposition. A low-temperature liquid metal (i.e., Hg, Ga, or alloy thereof) acts simultaneously as the source of electrons for the heterogeneous reduction of oxidized semiconductor precursors dissolved in an electrolyte as well as the solvent for dissolution of the zero-valent semiconductor. Supersaturation of the semiconductor in the liquid metal triggers eventual crystal nucleation and growth. In this way, the liquid electrolyte–liquid metal–solid crystal phase boundary strongly influences crystal growth.

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