3510-DS-P

DEPARTMENT OF COMMERCE

International Trade Administration

Notice of Decision on Application for Duty-Free Entry of Scientific Instruments, Cornell University, et.al

This is a decision pursuant to Section 6(c) of the Educational, Scientific, and Cultural Materials Importation Act of 1966 (Pub. L. 89-651, as amended by Pub. L. 106-36; 80 Stat. 897; 15 CFR part 301). On January 27 , 2021, the Department of Commerce published a notice in the *Federal Register* requesting public comment on whether instruments of equivalent scientific value, for the purposes for which the instruments identified in the docket(s) below are intended to be used, are being manufactured in the United States. *See Application(s) for Duty-Free Entry of Scientific Instruments, 86 FR 7271, January 27, 2021* (*Notice)*. We received no public comments.

Docket Number: 20-010. Applicant: Cornell University, Department of Materials Science and Engineering, Carpenter Hall, 313 Campus Road, Ithaca, NY 14853. Instrument: Six-axes sample manipulator for ample resolved photoemission. Manufacturer: Fermi Instruments, China. Intended Use: See Notice at 86 FR7271, January 27, 2021. Comments: None received. Decision: Approved. We know of no instruments of equivalent scientific value to the foreign instruments described below, for such purposes as this is intended to be used, that were being manufactured in the United States at the time of order. Reasons: According to the applicant, the instrument will be used to fabricate on site new material and to study its electronic properties with several experimental techniques. Angle resolved photoemission (ARPES) will be the main technique, as it conveys directly most information needed on the electronic structure of the material, *e.g.,* whether it is conducting/insulating/superconducting anisotropic, close to an electronic instability, likely to undergo an electronic transition, etc.

According to the applicant, this is of great importance for fundamental physics, but in a longer-term perspective, also in order to identify the potential of materials for applications, in particular in energy production, conversion and storage. The ARPES set up, as well as, the molecular beam epitaxy station for materials fabrication, will be used as a facility for internal and external users, which will have to submit proposals and apply for time to perform their experiments.

Docket Number: 20-011. Applicant: Cornell University, Department and Materials and Science Engineering, Carpenter Hall, 313 Campus Road, Ithaca, NY 14853. Instrument: Multi-gas lamp for angle-resolved photoemission. Manufacturer: Fermi, China. Intended Use: According to the applicant, the instrument will be used to fabricate on site new material and to study its electronic properties with several experimental techniques. Angle resolved photoemission (ARPES) will be the main technique, as it conveys directly most information needed on the electronic structure of the material, e.g., whether it is conducting/insulating/superconducting anisotropic, close to an electronic instability, likely to undergo an electronic transition, etc. According to the applicant, this is of great importance for fundamental physics, but in a longer-term perspective, also in order to identify the potential of materials for applications, in particular, in energy production, conversion and storage. The excitation source is a key element of any photoemission setup. It provides a beam of light which is directed to the sample and causes the emission of the electrons, object of the measurement. For angle-resolved photoemission, the standard excitation source is a helium (He) gas discharge lamp, which excites He atoms and emits light caused by the de-excitation process. It is widely used in many laboratories and sold by a few companies in the world.

Docket Number: 20-012. Applicant: University of Minnesota, Department of Chemical Engineering and Materials Science, 421 Washington Avenue, SE, Minneapolis MN 55455. Instrument: Spark Plasma Sintering Systems. Manufacturer: SUGA Co., Ltd., Japan.

Intended Use: According to the applicant, the instrument will be used to study a variety of structural ceramic and metal materials including refractory alloys (e.g., containing combinations of Nb, Ta, W, Mo, Zr, Hf, etc.,), (oxide ceramics such as $Gd_2Zr_2O_7$), ($Y_5Al_3O_{12}$), and $Y_2Si_2O_7$, and non-oxide ceramics such as SiC and Si_3N_4. The instrument will also be used to study the sintering or consolidation behavior of these materials and will be used to prepare dense specimens to be analyzed using other instruments. The research focuses on the development or materials with improved performance in extreme environments. The instrument will be used to generate dense specimens of the materials described above, which will subsequently be tested using other methods to determine their performance in oxidizing or corrosive environments. A key aspect of the investigations involved rapid consolidation in order to achieve high density while limiting grain growth associated with longer exposures to high temperature used in other sintering techniques.

Dated: February 23, 2021.

Richard Herring,
Director, Subsidies Enforcement,
Enforcement and Compliance.
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