エアロゾルに関する講演会のご案内

2016 年 6 月 23 日

University of Florida の Professor Chang-Yu Wu にエアロゾルに関する下記のような講演を行っていただきます。ご関心のある方はぜひご聴講ください。

■ 日　時　2016 年 8 月 1 日（月）15:30-16:30

■ 場　所　早稲田大学 西早稲田キャンパス 62W 号館 1 階 中会議室 (62W-108)
(キャンパスマップ: http://www.waseda.jp/fsci/access/)

■ 題　目　**Transforming Toxic Welding Fume through Condensation of Amorphous Silica**

■ 参加費　無　料　参加をご希望のばあい，整理の都合上，事前に川本 (kawa@waseda.jp) にご連絡ください．席に空きがある限り，前日まで受け付けます

■ 講　師　**Chang-Yu Wu**, Professor and Department Head, Dept. of Environmental Engineering Sciences, University of Florida

Professor Chang-Yu Wu received his BS from Mechanical Engineering Department at National Taiwan University and PhD from the Department of Civil & Environmental Engineering at the University of Cincinnati. His teaching and research interests range from air pollution control, aerosol science, environmental nanotechnology, dust control to engineering education. He has published more than 130 refereed journal particles and given 230+ conference presentations and 60+ invited lectures. His research has resulted in 6 US patents and 3 pending applications. An active member of Air & Waste Management Association and American Association for Aerosol research, he has received several awards recognizing his accomplishments in education, research and service.

■ 講演内容 The intensive energy of welding yields a high concentration of nanoparticles loaded with toxic metals such as hexavalent chromium (Cr^{6+}), nickel, and manganese. To reduce the hazards associated with the exposure to toxic welding fume, an innovative amorphous silica encapsulation (ASE) technology has recently been developed. Timely introduced into the system as an additive to the welding shielding gas, Tetramethylsilane (TMS) decomposes at the high-temperature welding arc zone to form amorphous silica that condenses and encapsulates the metals particles, thus reducing welding fume toxicity. Experimental results demonstrated that the addition of 3-5% of TMS carrier gas to the primary shielding gas resulted in an over 90% reduction of airborne Cr^{6+}, while silica coating efficiency was around 60-76%. XPS result confirmed complete elimination of Cr^{6+} inside the amorphous silica shell, and TEM imagery displayed evidence of silica coating on metal particles. Welding fume particle size increased from a mode size of 20 nm at the baseline condition to 180-300 nm when TMS was added. Biological tests using *E. coli* cells verified that the ASE fume had much lower toxicity than the untreated fume. Structure test confirmed no statistically significant difference of the mechanical properties of weld generated in the baseline samples and by the ASE technology. If implemented, the ASE technology can bring great health and safety benefits to welders, currently estimated to be at least 466,400 in the US alone.

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