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Superhydrophilic Metallic Coating: PVD Fabrication and Applications

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Superhydrophilic coatings represent a powerful class of biomimetic technologies that address diverse real-world challenges—from maintaining building cleanliness and optical clarity to enhancing safety in medical settings and efficiency in industrial processes. In this presentation, I will report a novel superhydrophilic coating based on a sputter-deposited 316 stainless steel layer. The coated surface exhibits a water contact angle of approximately 10 degrees. Furthermore, this coating demonstrates notable antifouling and underwater superoleophobic properties, making it highly advantageous for application in separation membranes designed for oil/water emulsions. In addition to its antifouling and separation capabilities, this coating has proven highly effective at enhancing electrochemical responses, making it an excellent functional layer for sensor electrodes. This presentation will provide specific application case studies to demonstrate its practical utility in this domain.

Brief Bio

Dr. Jinn P. Chu is the Chair Professor of Materials Science and Engineering at National Taiwan University of Science and Technology (Taiwan Tech). He obtained his Ph.D. in Materials Science from UIUC, and published over 230 articles with 50 patents. In recognition of his research, he received Taiwan Ministry of Science and Technology Outstanding Research Award, Taiwan National Innovation Awards, American Chemical Society (ACS) Award. He is one of Associate Editors of American Vacuum Society (AVS) Journal of Vacuum Science and Technology (JVST). He is also listed in Top 2% Scientists (Career Impact) (2021, 2022, 2024) and Top 2% Scientists 2021-2024 by Stanford University.

His research interests are focused on the physics and physical properties of thin-film metallic coatings grown by magnetron sputter deposition.