

Decarbonizing Navy's Operations: Large-Scale Hydrogen Storage and Production On-Demand

August 8, 2023 | 12:00–1:00 pm PST | MAE Auditorium, Bldg #255

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Abstract

Hydrogen is being evaluated as an energy molecule substitute for methane, the principal component of natural gas and to displace other hydrocarbon-based fuels and achieve zero or net-zero decarbonization of the energy sectors. However, the properties of H₂ are vastly different from methane, the latter being essentially inert to materials due to its tetrahedral chemical structure and high volumetric efficiency. Hydrogen, the lightest molecule on earth, poses challenges for high volume storage and transport. This talk will focus on strategies to develop a hybrid system that can store large volumes of hydrogen in small spaces and can produce hydrogen on-demand. The hybrid storage system could help decarbonize energy systems and find applications on naval bases.

Biography

Dr. Mahajan received his B.Sc. (Honors School) and M.Sc. (Honors School) from Panjab University, Chandigarh; his Ph. D. from the University of British Columbia, Canada in Chemistry; and completed his post-doctoral training at Brookhaven National Laboratory (BNL), New York. He joined the staff of BNL in 1983 and moved to Stony Brook University in 2002 and concurrently held a joint Scientific staff appointment with BNL till 2015. Dr. Mahajan's research interests include energy policies and decarbonization of power and transportation sectors by development of low-carbon technologies. He has published over 300 papers, delivered over 120+ lectures, edited 12 special journal volumes, and holds 15 patents.

