“Creating a Sustainable Battery Framework for a Climate Neutral Future”

Wednesday, October 20th
12:00 - 1:00pm

In light of the community concerns regarding COVID-19, this talk will be given as a webinar. The link will be provided on October 19th to those that have registered by 5:00 pm on Monday, October 18th at uccs.ucdavis.edu.

Li-ion batteries are currently used in portable consumer electronics such as cell phones and laptops, in powering electric vehicles and in stationary grid applications. Today, global battery demand in transportation, stationary and consumer electronics applications are 100, 25 and 60 GWh, respectively. In 2030, projected global demand in transportation, stationary and consumer electronics are expected to be 17x, 6x and 2x, respectively. China’s battery capacity is nearly 567 GWh and USA’s battery capacity is only 59 GWh. China’s battery production capacity is 3x more than the rest of the world’s capacity combined. Projected battery demand in 2030 is about 11x more than today’s demand. This creates a huge gap between demand and supply chain. Much more batteries are needed than the total amount produced. Hence, serious political and private investment are required to build more Gigafactories to close the gap between the battery supply and demand. This support has to be expanded to cover the battery manufacturing supply chain such as raw material production. Unprecedented amount of demand for raw materials could create stress in the supply chain especially from the minerals point specifically the ones that are not as abundant such as Li, Co and Ni. Hence, alternative battery materials or making of common battery materials using sustainable and renewable sources and from the waste become critical. In this presentation, Li-ion batteries and batteries beyond the Li-ion technology will be discussed. In addition, alternative common raw material preparation using biomass and natural sources will also be presented. Current and future material and battery supply chain challenges will be discussed and potential solutions will be introduced.

Dr. Mihi Ozkan is a professor of the Electrical and Computer Engineering Department at UCR. Dr. Ozkan is a Fellow of National Academy of Inventors and Frontier National Academy of Engineering, and UCR’s the first and only female engineering faculty receiving this honor. Dr. Ozkan’s research group has been developing unconventional solutions for Li-ion battery technologies using sustainable materials and green chemistry requiring low power processing. Transforming waste glass and plastic bottles, biomass (mushrooms, sugar) and natural sources such as sand and diatoms into high grade battery electrodes are among her group’s achievements. Dr. Ozkan has 29 granted and 15 active patents in the area of advanced Li-ion battery technologies for smart grid, electric vehicle and portable electronics applications. She has been selected as the most remarkable women of UCR by the UC Regents. Her creative research and innovative approaches for the advanced Li-ion battery technologies have brought her nearly 56 scientific national and international honors/awards. Dr. Ozkan has published 178 journal papers and 155 conference proceedings. Dr. Ozkan completed her graduate studies at Stanford University and at UC-San Diego.