Miquel B. Salmeron named 2012 MRS Medalist for surface science studies

The Materials Research Society has named Miquel B. Salmeron of the University of California–Berkeley and Lawrence Berkeley National Laboratory as MRS Medalist. He was cited for his "contribution to the molecular level understanding of material surfaces under ambient conditions of gas pressure and temperature made possible by the development and application of Ambient Pressure Photo-Electron Spectroscopy (APPES), which revealed the chemical structure of liquids, catalysts surfaces and nanoparticles during environmental reaction conditions." Salmeron will be recognized during the awards ceremony at the 2012 MRS Fall Meeting in Boston.

Traditionally, research on surfaces has been largely based on the use of electrons, atoms, and ions that require research to be carried out under high vacuum conditions. Salmeron developed, in the 1990s, ambient pressure photo electron spectroscopy (APPES), which advances the understanding of surface science in realistic gas environments.

With the development of APPES, researchers can use the surface and chemical sensitivity of electron spectroscopies to obtain information at high pressures based on core-level excitations, often providing critical information that cannot be obtained from other high-pressure techniques. Since the introduction of this instrument in 2002, Salmeron and his group have resolved some key surface science questions such as the structure of ice during premelting, the segregation of anions to the surface of saline solutions, wetting of water on oxide surfaces, oxidation of noble metals, and surface reconstruction of catalytically active

surfaces at high pressures. The APPES technique has been particularly valuable in industrial research for probing the chemical nature of surfaces in real-world environments. Today, the APPES technique has been commercialized by two companies and has been adopted by more than 10 synchrotron facilities around the world.

Salmeron received his BA degree from the University of Barcelona (1967) and his PhD degree from the Universidad Autonoma of Madrid, Spain (1975), both in physics. In 1984, he moved to the Lawrence Berkeley National Laboratory as a Divisional Fellow, becoming a senior scientist in 1990 and where he served as director of the Materials Science Division through August of this year. He joined the faculty at UC–Berkeley as an adjunct professor in 2006. He has 390 publications and four US patents. His honors include Fellow of the American Physical Society (1996) and of the American Vacuum Society (2003); the Klaus Halbach Award for the development of innovative instrumentation (2004); the Medard Welch Award of the American Vacuum Society and the Langmuir Lectureship Award of the American Chemical Society, both in 2008; and the Outstanding Lecturer Award, Pacific Northwest National Laboratory (2010).
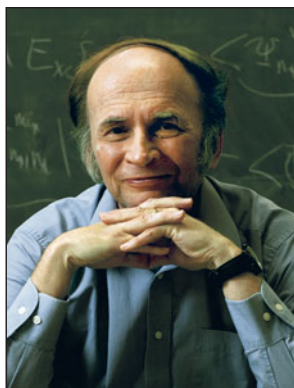
John P. Perdew receives 2012 Materials Theory Award for density functional theory

The Materials Research Society has named John P. Perdew of Tulane University in New Orleans, La., as the recipient of the 2012 Materials Theory Award for his "pioneering contributions to the fundamental development and nonempirical approximations in density functional theory." Perdew will be recognized during the awards ceremony at the 2012 MRS Fall Meeting in Boston.

The Materials Theory Award, endowed by Toh-Ming Lu and Gwo-Ching Wang, "recognizes exceptional advances made by materials theory to the fundamental understanding of the structure and behavior of materials."

In 1998, Walter Kohn was awarded the Nobel Prize in Chemistry for his 1964–1965 development of the density functional theory (DFT), recognizing a decisive milestone in the understanding of the behaviors of complex multi-electron and many-atomic systems. From there, Perdew and his colleagues helped build up the framework from first principles to resolve remaining challenges in materials science. For example, with David Langreth in