Professor Tobin J MARKS

Citation

Prof Tobin J Marks has been given an affectionate nick name: Molecule Master. In Eastern philosophy, a master is someone with a supreme command of a subject with an all-seeing wisdom. From the 95 named lectureships and awards, the nine editorial board memberships of major journals, the six advisorships of major corporations, the 205 US patents he holds and the 1,025 articles he has published, and with his h-index, which measures a scientist's productivity and impact, at 115, surely he has earned this honorific.

It is an irony of life that Prof Marks is doing something big for humanity by unleashing the power of the tiny molecule. Here is a scientist who thinks big by going small. In chemistry, Prof Marks sees a broad canvas for his master strokes. Few of us ever see chemistry as tied to human destiny, but this is what he has to say about the discipline that consumes his life: "The coming decades will present mankind with technical challenges threatening our quality of life. I believe that chemistry offers defining concepts and tools, and hence limitless opportunities, to better human life in many ways." All his adult life he has been doing just that.

Prof Marks is nothing if not tenacious. A fellow scientist describes him this way: "If he gets an idea, he pursues it, even if he has to make the molecular compounds himself." He once harbored dreams of being a writer or a historian. But luckily for humanity, he has turned his genius to chemistry, designing 'smart' molecules to make better catalysts for new kinds of plastics. Now plastics have been an essential, ubiquitous part of our lives. His new catalysts make possible the production of recyclable, environmentally-friendly plastics, resulting in the emergence of multi-billion industrial processes. When we think that plastics are everywhere in the world and everywhere in our lives, from garbage bags to food packaging, and from computers to wire insulation, we know how important Prof Marks is.

With Prof Marks in hot pursuit, organic light-emitting diodes or OLEDs are about to completely change the flat-panel display industry, with ultra-thin plastic displays for outdoor advertising, computer monitors, personal digital assistants, medical diagnostics and electronic books. OLEDs are good news for the environment as they are self-luminous and do not require backlighting, and are therefore far more energy-efficient than LCDs.

Prof Marks is studying how electricity is injected into plastic, how it flows through the material and is turned into light. With OLEDs, a low voltage is capable of producing a very bright light. In his own words, he is onto the exciting idea of "rationally designing completely new structures that self-assemble and generate the desired functions, such as rich color and viewing angle." His new idea will give us "thinner, brighter, sharper and more colorful and flexible displays" than current LCDs.

Prof Marks has also turned his attention to inorganic materials with uncommon properties, such as being visually transparent while being electrically conductive. They are sure to transform the next generation of television screens, energy-efficient windows and next-generation solar energy cells.

What Prof Marks embraces in his research is remarkably original and diverse. Not content with what chemistry yields, Prof Marks' research has gone interdisciplinary, discovering the novel chemical, physical or biological properties of substances. He is unafraid to challenge established dogma, often confronting fundamental problems head on. His research has resulted in huge savings in energy and precious resources. By his impact alone, he is a scientific master of the first order.

Less well known is his other accomplishment, mentoring over 100 PhD students and an equal number of postdoctoral fellows, not to mention hundreds of undergraduates. More than 100 of these alumni are now academics fanned out across the world.

The list of Prof Marks' accomplishments and awards is so long that it is the despair of anyone trying to chronologically keep up with them. With the professor relentlessly pushing the envelope, the day is not far off when car windshields will display maps, when we can hold Leo Tolstoy's 1,400-page *War and Peace* in a few thin sheets of recyclable plastic rolled up in our hands. Now that is science we can cheer for.

Mr Chancellor, on behalf of the Council of the Hong Kong University of Science and Technology, I have the high honor of presenting to you Prof Tobin J Marks, Vladimir N Ipatieff Professor of Catalytic Chemistry and Professor of Materials Science and Engineering at Northwestern University, for the award of Doctor of Science *honoris causa*.