Laudatio of Prof. Ramón González Rubio
on the ocassion of the Honoris Causa Doctorate of
Prof. Mario Molina-Pasquel.

7 June 2012

His Excellence Mr. Rector, University Authorities, Professors, and friends,

It is a great honor to present the "Laudatio" on the occasion of the nomination of Prof. Mario Molina Pasquel as Doctor Honoris Causa of Complutense University. First of all, I would like to thank the Rector of the University and the Faculty of Chemistry for their enthusiastic support that has made this Act possible. I would also like to thank Prof. Molina for having made everything possible to adapt his tight agenda for being here today.

Prof. Molina is not only an exceptional scientist whose research has lead to very important social and economic consequences. He is also a citizen strongly committed to a key social goal: To make it possible that our generations leave to the next ones a Planet whose environmental conditions have not strongly deteriorated, and a Society that is sustainable from the energetic point of view.

Prof. Molina was born in Mexico D.C. in 1943, where he obtained the Chemical Engineering degree in 1965 at Universidad Nacional Autónoma. As many other scientists in the world, he decided to broaden his scientific education doing postgraduate studies at Friburg (Germany), where he performed research on Polymerization Kinetics, and he started his cooperation with European research groups. After two years in Germany Prof. Molina decided to explore other areas of research, being curiosity and the interest for knowledge the main driving forces for his selection of the scientific problems to get involved in; in other words, he focused his interest in what some people call Basic Research. Joining the group of Prof. Pimentel at the University of California at Berkeley allowed him to get involved in one of these research problems: the Molecular Dynamics of chemical reactions, and to obtain the Ph.D. in Physical Chemistry in 1972. Afterwards, he moved to the University of California at Irvine, where, first as a Research Associate and later on as an Associate Professor (1973 – 1979), he started a very fruitful collaboration with Prof. Frank Sherwood Rowland. They worked on the decomposition kinetics of chlorofluorocarbons, CFC. These compounds were very attractive for the industry because they are non-toxic, water insoluble, and very stable on the troposphere,

where their mean life-time is over 100 years. Because of these characteristics they were extensively used since 1940 as solvents, refrigerants, propellers in aerosols, etc.

Molina and Rowland realized that, though stable in the troposphere, sooner or later the CFCs would migrate to the stratosphere where they might decompose through a photolysis process triggered by the solar radiation. They asked themselves two simple but key questions: the first was which products would be produced in those chemical reactions, and the second was which would be the consequences of their presence in the atmosphere. Their research allowed them to establish that the chlorine produced in the decomposition reaction might act as a catalyst for the decomposition of the atmospheric ozone. The role of the chloride was similar to that of the natural nitrogen oxides the control the ozone level, and that had been previously studied by Prof. Paul Crutzen. However, a very important difference is that the amounts of CFCs liberated by the industrial activity were huge, and so it was the risk of destruction of the ozone layer that protects life from the UV radiation!

The above results were published in Nature in 1974, and Prof. Molina and Rowland got involved in a campaign for spreading the knowledge about the risk of the ozone layer destruction between scientists, public institutions and companies. Even though the initial response was not very supportive, Prof. Molina has pursuit his activity “in pro” of environmental protection till present. Molina and Rowland’s predictions were, unfortunately, confirmed by the discovery of the “ozone hole” over the Antarctic during the Austral Spring in 1985. At that time Prof. Molina had already moved to the Jet Propulsion Laboratory of the California Institute of Technology (1982-1989) where he pointed out that the mechanism leading to the “ozone hole” was more complex than previously thought, the surface of the ice crystallites present in the polar stratospheric clouds playing a key role in ozone destruction. In 1989 Prof. Molina moved to the MIT, and since 2003 is Professor at the University of California at San Diego, and of the Oceanographic Institute CRIPPS. Also, since 2005 he is the President of Mario Molina Center for Energy and Environment Strategic Studies of Mexico. His recent research focuses on the Chemistry of pollution in the low atmosphere, and in the Chemistry of global atmospheric processes.

The scientific results and the divulgation work of Prof. Molina and Rowland finally succeeded, and in 1994 the Nations that were the main producers of CFCs signed the Montreal Protocol in which they agreed to stop CFC production and their substitution by other chemicals more friendly from the environmental point of view. In 1995 the Swedish Academy awarded the Nobel Prize of Chemistry to Prof. Molina, Rowland and Crutzen for their work. Also that year they received the award of the United Nations Program Environment (UNEP) for their contribution to the protection of the ozone layer.

It would take too long to mention all the awards and honors of Prof. Molina, thus I will only mention a few of them. He was elected fellow of the National Academy of Sciences and of the National Institute of Health of the United States of America, as well as of the Pontificial Academy of Science of the Vatican, the National College and the Academies of Science and of Engineering of Mexico. He has received several prices, such as the Tyler award on Energy and Ecology in 1983, the Esselen medal of the American Chemical Society, the Newcomb-Cleveland award of the American Association for the Advance of Science, the medal of NASA for exceptional scientific achievements, the Max Planck medal for Research, the United Nations Sasakawa award in 1999, and more than 30 Honoris Causa doctorates.

I have previously mentioned that already the driving force for choosing the research subject for his Ph.D. thesis was his interest in increasing his knowledge on basic aspects of Physical Chemistry. It is more and more frequent to hear from the persons in charge of the research funding agencies of some countries that it is absolutely necessary that the funds used for Research produce benefits for Society. A frequent consequence is that they establish Applied Research as the priority. However, the Research carried out by Prof. Molina seems to confirm something already said by Louis Pasteur in the XIX century: “There is no Applied Science but Science applications”. Can anyone imagine any “Applied Research” having more important social, political, economical and technological consequences than the “Basic Research” done by Prof. Molina and his coworkers? Perhaps some people should think again about the so-called Linear Model described by Schumpeter in the 50’s. According to that model the transfer of knowledge follows a simple sequence: basic research is followed by a stage of technological development that scales the results to the industrial scale, and the last stage is the industrial innovation in the shape of a new product or process. The multidisciplinary character of most of the modern research areas and technological challenges has clearly pointed out that the Linear Model is no longer valid. Therefore, the funding agencies must have a more global view and a lot of imagination for Science to help solving the most important problems that Society has to face in the XXI century.

As a citizen committed to Science and Environment, Prof. Molina has been very active in contributing to define environmental policies. He has taken part in the IV Report of the Intergovernmental Panel for Climate Change, and has been a member of the Committee of the Interacademic Council in charge of reviewing the procedures and methodology of the Panel. Furthermore, since 2008 Prof. Molina has been a member of the Presidential Committee of Advisors for Science and Technology of the U.S.A. Here Prof. Molina faces a formidable challenge: to convince the authorities that the U.S.A. might play a more active role in reducing the Global Climate Change, so that the world can advance with respects to the results of the Kyoto, Cancun, Copenhagen and

Durban summits. Prof. Molina has explained in many international conferences that we already have the necessary technology to avoid one of the worse scenarios of the Global Climate Change: that at the end of this century the global temperature increases more than two degrees. He has also demonstrated that the cost of taking the appropriate steps to reach that goal (between 1 and 3% of the global GNP) is relatively small compared with the scenario of doing nothing right now. One can summarize the ideas that Prof. Molina tries to spread to the citizens and the policy makers to stop the Global Climate Change using a sentence of one of his speeches: "Scientists can establish which problems will affect the environment on the basis of the evidences available, however their solution is not scientists' responsibility, it is the responsibility of the whole Society".

All the above mentioned academic, scientific and human merits clearly justify our welcome to Prof. Molina to our University that from now on is also his.

Thank you very much.