PURDUE UNIVERSITY

PURDUE POLYTECHNIC LAFAYETTE

Professor Sara Snogerup Linse, Chair
2016 Nobel Prize for Chemistry
The Royal Swedish Academy of Sciences
PO Box 50005
SE-104 05, Stockholm, Sweden

Subject: Nomination for the 2016 Nobel Prize in Chemistry for Dmitry V. Schur, Svetlana Yu. Zaginaichenko, and T. Nejat Veziroglu

Dear Professor Linse:

I am pleased to nominate and strongly support two Ukrainian scientists, Dmitry V. Schur, Svatlana Yu. Zaginaichenko and one American scientist, T. Nejat Veziroglu, for the Nobel Prize of 2016 in Chemistry. They have published a seminal paper entitled, "The hydrogenation process as a method of investigation of fullerene C_{60} molecule" (*IJHE*, 2015, 40(6): 2742-2762).

In the past two decades, these three scientists have performed an important array of scientific investigations of fullerenes and other carbon nanomaterials, thereby contributing extensively to the development in this field. Their research has been conducted to discover a better understanding of the processes of fullerene C_{60} formation, crystallization and application.

In my view, among the many applications of this research, one of the most important is the effective storage and release of H_2 thereby facilitating the widespread entry of hydrogen as a critical non-C transportation fuel. This application is essential if civilization is to deflect the massive quantities of anthropogenic CO_2 now emitted that are the primary cause of climate-disruption risks.

Turning back to the specifics of my nominees' contributions, through successive pentagon-migration transformations, the perfect fullerene structure has been achieved within a nanosecond of the process. Their paper presents aspects of the formation of carbon nanostructures in arc evaporation of graphite in the gaseous phase. Their research has substantiated the need to pursue consideration of pentatomic cycles in the frame of fullerene C_{60}, as pentatomic molecules forming it. The paper proposes a mechanism of formation of the fullerene C_{60} frame from five-atom molecules, and also suggests the names of modifications of fullerene C_{60} molecules, differing in the temperature of existence and number of double bonds in their pentatomic cycles. The paper lays the groundwork for the theory of existence and transformation of spherical molecules.

The generation of high quality fullerene structures has demonstrated many new applications in addition to hydrogen storage. Although fullerene is now recognized as an attractive new material, the formation mechanism of such symmetric hollow caged structures has not yet been fully understood and explored. Besides physic-chemical interests, it is important to understand the formation mechanism in order to find the optimum conditions of generating fullerenes towards the development of nanoscience.

I unhesitatingly endorse Drs. Schur, Zaginaichenko and Veziroglu as meriting the 2016 Nobel Prize in the field of chemistry.

I trust you will forward my nomination to your Committee for the 2016 Nobel Prize for Chemistry.

Yours sincerely,

John W. Sheffield

John W. Sheffield, Ph.D.
Visiting Professor, Engineering Technology, Purdue University
Executive Vice-President, International Association for Hydrogen Energy