

In memory of Vladimir Grigor'evich Firsov

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Vladimir Grigor'evich Firsov, DSc in chemistry, the principal research scientist of the State Scientific Center of Russian Federation 'Institute of Theoretical and Experimental Physics' (ITEP) Moscow, died on January 1, 2002 at 70 years of age. Firsov was the founder of a new branch in radiochemistry: the chemistry of muonium.

Having graduated from high school in 1949 with a gold medal, Firsov entered the Chemical Department of the M V Lomonosov Moscow State University. Firsov was a brilliant student, and after graduating the University in 1954 he started to work at the Thermotechnical Laboratory (TTL) which was later rechristened to ITEP. From the very beginning Firsov showed himself to be a talented experimentalist and took part in solving a number of radiation chemistry problems connected with the design of the boiling-water homogeneous reactor.

Vladimir Grigor'evich worked at ITEP all his entire creative life. He started as a laboratory assistant and in 1962, under the guidance of B W Ershler and L Ya Suvorov, presented and defended his PhD thesis, and then his DSc thesis in 1970. From 1972 to 1998 he headed the laboratory of physical chemistry.

In 1965, for the first time, Firsov suggested to use the depolarization of positive muons in condensed media for the determination of the chemical reaction rates of hydrogen-like atoms in condensed matter. This idea, supported by A I Alikhanov and I Ya Pomeranchuk, proved to be very fruitful and became the basis of the muon chemistry. Nowadays this field is being successfully developed in many countries; V G Firsov was the recognized leader in this research.

Thanks to V G Firsov's initiative and energy, muon spectrometers have been created and then continued operating at Dubna and Gatchina. In the 1970s Firsov and his colleagues at ITEP and JINR developed a method of using positively charged muons to probe the interaction between muonium and the lattice of crystalline solids, especially of semiconductors. Among the most outstanding achievements in this work we can mention the discovery of the muonium atom in condensed media; this work received the certificate of discovery No. 161. This phenomenon was first observed in 1965, by Firsov's D group at ITEP, via the Larmor precession of muonium in crystalline quartz in a transverse magnetic field; Firsov directed and actively participated in this work.

In 1969, Firsov leading a large group of physicists, experimentally established for the first time the property of one-electron atoms embedded into the semiconductor lattice forming deep donors. This property of one-electron atoms manifest itself in a significant reduction of the dimensions of the localization area of the electron in an atom, as compared with a similar characteristic of shallow-level



Vladimir Grigor'evich Firsov
(29.02.1932–01.01.2002)

hydrogen-like centers. This phenomenon was certified as discovery No. 259.

Vladimir Grigor'evich vigorously contributed to the development of positron spectroscopy; this is a field in which ITEP occupies one of the leading positions in the world. Firsov organized a systematic study of the physico-chemical interactions of muonium and positronium with the crystalline lattice of elementary semiconductors and complex binary compounds, then an investigation of the kinetics and mechanism of chemical reactions in the liquid phase. These activity was highly esteemed and supported by V I Goldanskiĭ, I I Gurevich and V P Dzhelepov.

Having established the mechanism of formation of positronium and muonium in liquids, Firsov did much work studying early physico-chemical radiolytic processes. A number of papers were published on the study of the reactions of muonium with inorganic ions and complex organic molecules in aqueous and organic media; then the group analyzed the kinetics of the processes, determined chemical reaction rate constants for a wide class of compounds, and revealed a similarity among the mechanisms of formation of positronium, muonium and radiolytic hydrogen.

V G Firsov published more than a hundred research papers.

In the last years Vladimir Grigor'evich, as a member of the Organizing and Editing Committees, devoted much time to organizing Moscow International ITEP Physics Schools and to publishing their proceedings.

Vladimir Grigor'evich was a man of great integrity. He was a very modest, intelligent and profoundly principled person with great and well-deserved authority in the institute. As head of the laboratory, he was an exceptionally considerate superior who was very attentive and caring in relations with his colleagues working in his laboratory.

Vladimir Grigor'evich had an interesting and remarkable personality, he was a good chess player and a keen mountaineer and sport tourist.

The death of Vladimir Grigor'evich Firsov is bereavement for Russian science. Those who knew him will long cherish a warm memory of his personality.

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