THE CONTRIBUTION OF PROFESSOR G.A. RAZUVAEV TO ORGANOMETALLIC CHEMISTRY

On August 23rd 1980, Professor G.A. Razuvaev, Member of the U.S.S.R. Academy of Sciences and an eminent scientist in the field of organometallic chemistry was 85.

G.A. Razuvaev was born in Moscow in 1895 as the son of an engineer. After finishing secondary school he entered the Natural Science section of the Physico-Mathematical Faculty of Moscow University. He proceeded with his studies at Leningrad University and graduated from it in 1924. After graduation G.A. Razuvaev began working at the Laboratory of High Energies of the U.S.S.R. Academy of Sciences with Professor V.I. Ipatyev. In 1928 he was appointed assistant director of the Laboratory of High Energies, and he later became head of the Organic Chemistry Section of the Institute of Higher Energies of the U.S.S.R. Academy of Sciences. From 1929 G.A. Razuvaev spent two years in Germany where he worked with Professor G. Viland. In 1931 he was appointed to the chair of organic chemistry at Gorky State University. In 1963 G.A. Razuvaev took an active part in setting-up the Laboratory of Polymer Stabilization, the head of which he became. In 1969 the Laboratory was reorganized into the Chemistry Institute of the U.S.S.R. Academy of Sciences. G.A. Razuvaev has occupied the post of Director of this Institute since the day of its foundation.

The creative activity of Professor G.A. Razuvaev is connected with the establishment and development of the chemistry of homolytic reactions of organometallic compounds. G.A. Razuvaev became interested in this field as early as 1925 when he worked at the Laboratory of High Energies of the U.S.S.R. Academy of Sciences where he studied reactions of organometallic compounds with hydrogen under the guidance of Professor V.I. Ipatyev. Later, he continued his study of homolytic reactions at the laboratory of Professor G. Viland where he investigated thermal decomposition reactions of asymmetric diacyl peroxides.

In 1931 G.A. Razuvaev undertook research on homolytical reactions of organometallic compounds. In those years, at the very outset of the chemistry of active radicals in solutions, he devoted himself to the study of short life-time free radicals in photo- and thermal decompositions of organometallic compounds and peroxides in the liquid phase. At the same time he studied the reactivity and synthesis of organoarsenic derivatives, and discovered free radicals of the dihydrophenarsazine series.

Later, in Gorky, G.A. Razuvaev carried out an extensive series of investigations concerning free-radical reactions upon photolysis of organometallic

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compounds of non-transition metals and halogen derivatives as well as upon thermolysis of peroxides and azo compounds. This research culminated in the discovery of free-radical mechanisms for many reactions involving organometallic compounds (thermal decomposition, hydration, exchange reactions, interaction of organometallic compounds and alcohols, halides, etc).

G.A. Razuvaev showed that free radicals, being the decomposition products of acyl peroxides, may be fixed on metals. For mercury this can be employed for preparative purposes. The observation of radical chain reactions taking place in the decarboxylation of mercury salts gave rise to a new method of alkyl (aryl) mercuracylate synthesis.

The next step of his investigations was a combination of peroxide and organometallic chemistries. G.A. Razuvaev directed the study of various organometallic compounds (derivatives of silicon, tin, thallium, antimony, etc.) and the synthesis of them, having shown the possibility of both homolytic and heterolytic processes for these compounds, and of their rearrangements in particular. The great importance of organometallic peroxides in autooxidation reactions of organometallic compounds stimulated numerous studies of their autooxidation mechanism.

G.A. Razuvaev has obtained valuable scientific data on the chemistry of stable radicals. Of particular interest is the synthesis of aroxyl radicals containing Ge and Si atoms in an *ortho*-position to oxygen. The characteristic property of silicon-containing aroxyls is shown to be a recombination which is accompanied by the migration of the *o*-trialkylsilyl group.

G.A. Razuvaev started the original investigations of transition metal complexes with free-radical ligands. Based on a study of *ortho*-semichinon complaxes of palladium, nickel, copper and others, the radical ligand was shown to be a convenient spin label for monitoring the changes occurring in the coordination sphere of the metal (interchange of neutral and valent-bonded ligands, change of configuration, dissociation and solvation of the complexes, etc.).

Much of the work was concerned with bi- and polynuclear organometallic compounds in which atoms of various elements were covalently bonded. More than 450 new compounds of this type (with chains involving two, three or four atoms of various metals) were synthesized during the 15 year development of this study. Oligomeric polynuclear compounds with chains of 8 or 9 metal atoms have been obtained recently.

A notable advance has been made in studying the synthesis and reactivity of transition metal compounds with ligand—metal σ- and π-bonds (chromium, titanium, vanadium, zirconium and others). G.A. Razuvaev was the first to investigate numerous organotitanium derivatives, reactions of metallocenes with halide derivatives and peroxides, as well as reactions of transition metal compounds and ferrocenyl ligands. He has made a substantial contribution to investigations on the structure and reactivity of transition metal π-complexes, and particularly to the thermal decomposition of these organometallic compounds.

Extensive studies on the increase of the thermal stability of polymers and polymer-based compositions are now being carried out under G.A. Razuvaev. A number of Group IVB organoelement isocyanates and corresponding carbon ylides have been synthesized and investigated. Some of these compounds as well as their synergistic mixture with organic phosphites appear to be active

stabilizers for polyvinylchloride.

Prof. Razuvaev's fruitful scientific activity has resulted in the publication of nearly 800 research papers. Among his ex-pupils there are more than 10 professors and over 100 candidates of science. And now, at the age of 85, G.A. Razuvaev continues working. He is full of energy, purposeful enthusiasm and creativity, and is always surrounded by numerous disciples, colleagues and friends.

The editors and the publishers of the Journal of Organometallic Chemistry congratulate Prof. G.A. Razuvaev on his birthday and wish him good health and future success in his research work.

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