ANATOLY VASILEVICH NIKOLAEV
(in honour of his 70th birthday)

Anatoly Vasilevich Nikolaev, Member of the Soviet Academy of Sciences, Director of the Institute of Inorganic Chemistry, Siberian Department of the Academy of Sciences of the U.S.S.R., celebrated his 70th birthday on November 27, 1972.

A pupil of N. S. Kurnakov, V. I. Vernadsky and A. E. Fersman, immediately after graduating at Leningrad University Nikolaev found himself involved in a range of problems of great significance both scientifically and economically.

One of the first scientific and practical tasks in the solution of which Nikolaev actively participated was the study of Kazakhstan and Siberian salt lakes. These studies laid the foundation for the theory of sulphate accumulation in rivers and promoted the development of the salt industry in the U.S.S.R.

The investigation of natural and synthetic borates, begun in 1934, is an important field in the research work of A. V. Nikolaev. He was the first to synthetize many calcium, magnesium, potassium and sodium borates, and studied their solubility systems. By means of their thermal analysis, he detected a new exothermic effect, the so-called borate rearrangement, consisting in the transition from the amorphous state into the crystalline state; devitrification and other transitions from non-equilibrium forms into equilibrium forms were also studied. The results of these studies were generalized in Nikolaev's doctoral thesis (1940) and were rewarded in 1947 by the first award of the Vernadsky Prize.

In common work with A. M. Rubinshteyn, Nikolaev studied the thermal stability of more than forty platinum, palladium, rhodium, etc. ammines, and demonstrated that the majority are thermodynamically unstable. In the solid state, these compounds undergo exothermic transformations when heated, the processes conforming with the trans-effect rule established by I. I. Chernyaev. Not only was the isomerization of *cis*-diammines into *trans*-diammines and thermodynamic stability of the latter demonstrated, but the sequence of stability of the ammines in the solid state was also established.

The wide potentialities of DTA methods were demonstrated in studies of the physical-chemical properties of reactive fluorides, such as halogen compounds of fluorine, alkali fluorohalides and xenon fluorides. Nikolaev disclosed the existence

of xenon tetrafluoride adducts with Lewis fluoroacids, synthetized the compound $XeF_4 \cdot IF_5$ and determined its thermal properties.

Further work in this field under the guidance of Nikolaev led to the synthesis of a new class of inorganic fluorides, based on graphite and fluorohalide compounds.

In recent years, Nikolaev has started research on the kinetics of thermal solid-state processes involving the substitution of ligands in coordination compounds by organic multidentate ligands. These studies began with the investigation of the solid-state transition of asymmetrical EDTA chelates with two metal ions into symmetrical binuclear chelates.

A. V. Nikolaev is President of the Scientific Council for Thermal Analysis of the Academy of Sciences of the U.S.S.R., and President of the Soviet National Centre for Thermography.

Radiochemistry and the chemistry of extraction processes are also important fields of Nikolaev's scientific activity. His work has led to the development of methods of obtaining numerous substances in the ultrapure state and to the formulation of basically new concepts in the chemistry of extraction processes (concentration threshold of extraction, extraction beam, salt-out coefficient, element interaction in extraction, partition and separation diagrams, etc.).

Based on investigations of the electron structure of extracting agents and sorbents, carried out by means of X-ray spectrography, Nikolaev formulated the scientific principles of predicting the specificity of extracting agents and sorbents. He developed methods for preparing ultrapure gold (99.9999% and more). In recent years, Nikolaev and his school have employed physical-chemical analysis to developed fundamental concepts on clathrate formation in liquid-liquid systems, and have given the explanation of the lower critical point. Concepts on the nature of solid solutions of rare earths have also been developed.

Altogether Nikolaev has published over 500 papers, including 10 monographs.