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Alexander A. Trifonov received his diploma degree in chemistry at the State University of Gorky (USSR) in 1984. During his PhD studies he has been working at the Institute of Organometallic Chemistry of Russian Academy of Sciences (Nizhny Novgorod) under supervision of Prof. M.N. Bochkarev and in 1989 received his PhD. He did postdoctoral studies at the Technical University of Berlin, Germany (Prof. H. Schumann, 1991), Université de Paris-Sud, France (Prof. H. Kagan, 1993-1995). In 1999-2000 he was an A. von Humboldt fellow in the research group of Prof. J. Okuda (Mainz University, Germany). In 2003 he defended the Doctor of Science thesis and in 2005 became a head of the Laboratory of coordination chemistry at the Institute of Organometallic Chemistry (Nizhny Novgorod, Russia) and a professor of Chair of Physical chemistry at Nizhny Novgorod State University. Since July 2018 he was appointed a director of Institute of Organoelement Compounds of Russian Academy of Sciences (Moscow). In 2019 he was elected a corresponding member of Russian Academy of Sciences

His research interests are in the field of synthesis of organometallic and coordination compounds of rare-earth and alkaline earth metals and their application in homogeneous catalysis and material chemistry. The main scientific results of A. Trifonov were obtained in the synthesis of new highly reactive compounds of rare- and alkaline earth metals - efficient catalysts for reactions of C-C and C-E (N, P, Si, S) bond formation, including enantioselective ones, and reactions of activation of sp^3- and sp^2-hybridized C-H bonds. He developed catalysts for stereospecific isoprene polymerization; catalysts for the synthesis of biocompatible and biodegradable polymers based on cyclic polyesters; synthesized bifunctional lanthanide complexes possessing the properties of single molecular magnets (SMM) and metal luminescence. A new class of SMMs has been developed, which are cationic bisalkoxide, bisamide, bishalide complexes of Dy^{3+}, Tb^{3+} with a pentagonal bipyramidal or octahedral structure of the coordination polyhedron and the arrangement of anionic ligands in axial positions. A number of cationic dysprosium complexes have been obtained, which are characterized by a slow relaxation of magnetization at temperatures up to 100 K, and the anisotropic barrier has the highest values among those published to date (U_{eff} = 1585 cm^{-1}, T_B = 35 K). For octahedral cationic bis(alkoxide) Dy^{3+} complexes a new mechanism for the

formation of a high blocking barrier has been discovered, consisting in the suppression of single-phonon transitions between three low-lying multiplets of the crystal field due to large energy gaps between them, exceeding the available phonon energies. It is demonstrated that an increase in U_{eff} and T_B can be achieved by reducing the quantum tunneling of magnetization as a result of optimizing the geometry of the coordination polyhedron upon transition to the D_{5h} symmetry group and increasing the bond lengths in the equatorial plane. A. Trifonov discovered phenomena new to lanthanide chemistry, such as thermally induced redox isomerism in ytterbium complexes with redox-active diimine ligands; the possibility of steric control of oxidation-reduction reactions; reversible metal-redox-active ligand electron transfer regulated by the nature of the solvent; lanthanide compounds featuring non-typical metal-ligand interactions have been synthesized.

A. A. Trifonov is the author of more than 550 publications, including >260 articles, 18 reviews and chapters in the books. The total citation of his works (according to Web of Science, Scopus) exceeds 7500, and the Hirsch index is 48.

Under his supervision 19 PhD theses have been defended and currently 4 are being carried out. He is a member of the Scientific Council of the Russian Academy of Sciences on organic chemistry, chemical physics, the Scientific Councils of INEOS RAS, IMC RAS. A. Trifonov was a member of the international editorial board of Organometallics (American Chemical Society) and currently is a member of the editorial board of Russian Chemical Bulletin, a member of the International Advisory Boards of the International Conferences on Organometallic Chemistry (ICOMC) and the International Symposium on Homogeneous Catalysis (ISHC). In 2019, for his contribution to the development of science, education and Russian-French scientific cooperation he was awarded the title of Officer of the Order of Academic Palms (France).