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News Briefs

B.V. DERJAGUIN: 1902 – 1994

Professor Boris Vladimirovich Derjaguin died on May 16, 1994, at the age of 92. He laid foundations of the modern science of colloids and surfaces. After graduating in physics from the Moscow State University in 1922, Derjaguin began his scientific career at the Institute of Biophysics. In 1932, at the Institute of Applied Mineralogy, he started studying thin interlayers of liquids and in 1935 he began work at the USSR Academy of Sciences by organising the Laboratory of Thin Films at the Institute of Colloids and Electrochemistry, now called the Institute of Physical Chemistry. In 1966 his laboratory was expanded to form the department of Surface Phemomena. Derjaguin remained there until the last days of his life.

Derjaguin was appointed professor in Physics in 1935 and awarded his doctoral degree in chemistry in 1936 without having to defend his thesis, a singular honour. In 1946 he was elected a corresponding member of the Academy of Sciences of USSR, and in 1992 a full member of the Academy.

B.V. Derjaguin became known world–wide owing to his classical work on the theory of stability of colloids, known as DLVO theory (Derjaguin – Landau – Verwey – Overbeek). He published more than one thousand printed works, including monographs published both in Russia and abroad. His scientific achievements were widely acknowledged. He was awarded the Lomonosov (1958) and Mendeleev (1984) prizes of the USSR Academy of Sciences for his fundamental research. In 1965, Clarkson College (Potsdam, USA) conferred an honorary doctorate upon him. He was a member of the Faraday Society and served for several years as the vice–president of the International Association of Colloid and Interface Science. In addition to the Russian Academy of Sciences, he was a full member of the International Academy of Natural Sciences *Leopoldina*, the New York Academy of sciences, International Academy of Creative Arts, and the Russian Academy of Natural Sciences.

COBALT IN Nd MAGNETS

Cobalt has two magnetic properties which make it unique. It can increase the magnetic saturation of iron, hence the Permendur 49/49/Fe/Co alloy with saturation up to 23.5 kGauss. Secondly, it has the highest known Curie temperature (1121 ^{o}C). These two properties have seen cobalt through magnet steels, Alnicos, Sm–Co and Permendurs. It seemed, however, that the most recent developments with Nd–Fe–B magnets were happening without cobalt. The following Table summarises maximum temperatures possible in applications of assorted permanent magnets.

Material	Curie Temperature T_c (° C)	Max. use temperature (° C)
AlNiCo9	850	app. 500
SmCo (1:5)	720	app. 250
SmCo (2:17)	800	app. 350
NdFeB	310	app. 120

It has, however, been recently shown that by replacing some iron with cobalt can increase thermal stability by raising the Curie point dramatically to 650°C in $Nd_{15}(Fe_{1-x}Co_x)_{77}B_8$, where $x = 0.6$. In real terms, it is possible that cobalt will be present in the concentration of around 10 to 13 per cent.

PERMANENT MAGNET SHORT COURSE

Princeton Electro–Technology Inc. held its 12th Technology Short Course with accompanying exhibition, on permanent magnet design in October 1994, in Detroit, USA. Topics included the latest developments in material properties and processes, magnet behaviour under various environmental conditions, modern methods for magnetic circuit design and analysis. Particular emphasis was placed on Nd–Fe–B.magnets. The course was presented by F.G. Jones (magnet properties, production methods and costs), P. Campbell (magnet stability, circuit design and field analysis), R. Strnat (magnetisation and testing, techniques and equipment) and D. Howe (application and design studies).

MOVING SUSPENSIONS IN A MAGNETIC FIELD

In his recent publication *Action of a static magnetic field on moving solutions and suspensions* (Koll. Zh. (Russia) **56**, (1994), 234) N.I. Gamayunov suggested that the Lorentz force causes local deformation of the electrical double layer of variously sized particles moving with a carrying fluid in a magnetic field. This deformation temporarily decreases the barrier of the ionic electrostatic repulsion and results in coagulation of solid particles and coalescence of air bubbles. The change in solute dispersity from ionic to macroscopic particles favours the transition of the water bound by particles to free water with enhanced activity. It is also proposed that great masses of solutions in oceans and streams moving in the geomagnetic field have been exposed to the above described action which facilitates formation of crystals from salt solutions and their further co–precipitation into sedimentary rocks, as well as the linking of organic macromolecules into associates and larger aggregates which led to the creation of amino acids and proteins, i.e. life on earth.