

electronica 2012:

VAC presents innovative materials at the world's leading trade show for components, systems and applications

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VACUUMSCHMELZE GmbH &
Co. KG
Tel. +49 (0)6181 / 38-0
Fax +49 (0)6181 / 38-2645

**Cornelia Krannich/
Stefan Ehgartner**
Bite Communications
Flößbergasse 4/Haus 2
D-81369 München
Tel. +49 (0)89 / 444 46 74 55
Fax +49 (0)89 / 444 46 74 79
cornelia.krannich@
bitecommunications.com
stefan.ehgartner@
bitecommunications.com

**Contact address for readers' en-
quiries:**

VACUUMSCHMELZE GmbH &
Co. KG
Postfach/P.O.B. 22 53
D-63412 Hanau
Tel. +49 (0)6181 / 38-0
Fax +49 (0)6181 / 38-2645
info@vacuumschmelze.com
www.vacuumschmelze.com

Hanau / Frankfurt – "Advanced Materials - The Key to Progress" – Hanau-based VACUUMSCHMELZE GmbH & Co. KG will prove the truth of this statement at this year's electronica (13 to 16 November in Munich), where the company will demonstrate its materials expertise. At stand 119 in Hall B5, VAC staff will inform visitors about the latest advanced developments in the company's dysprosium-reduced permanent magnet material VACODYM®. A model of the "Solar Impulse" aircraft, powered by solar energy alone, will serve as a fascinating example of the diverse applications for low-loss motors built using the new ULTRAVAC® 44 V6 alloy. VACODUR® 49 is another alloy used in high-speed motors and generators, offering magnetic and mechanical properties significantly superior to the classic electrical steel used in this field.

VAC is currently exploring numerous approaches to reduce the proportion of the rare earth metal dysprosium in its proven **VACODYM** range of alloys. In doing so, the Hanau company is responding to the general uncertainty in the market concerning price trends for this raw material. The addition of dysprosium to the alloy serves to enhance temperature stability and is also regarded as a classic way of increasing the coercivity. VAC is currently trialling methods of reducing the proportion of dysprosium by means of dysprosium diffusion. In this process, dysprosium is not distributed evenly throughout the alloy, but is added only to the relevant areas within the alloy structure using special processes. As a result, the remanence remains consistent while the coercivity is increased by approximately 320 kA/m. An alternative process currently undergoing testing by VAC involves varying the size of the powder particles. The smaller the particles of material used in the production of sintered magnets, the higher the coercivity of the magnets. In a third method, dysprosium is omitted altogether, at least for magnets designed for use at up to approx. 120° C. VAC is currently experimenting with the addition of lower-cost elements which deliver the same effects as dysprosium.

At this year's electronica, VAC will take the opportunity to present advanced materials designed to maximise the efficiency of electric motors. The company's new **ULTRAVAC 44 V6** alloy, for example, offers properties that significantly boost performance optimisation in high-efficiency electric motors. The highest-profile application of this at present is the new HB-SIB aircraft from the Solar Impulse project, the motor of which uses ULTRAVAC 44 V6 in its stator and rotor assembly. A model of its predecessor, the HB-SIA, will be on display at the stand. In addition, the magnetic drive of the motor contains magnetic systems comprising small bonded segments of VACODYM. This segmented design, combining small individual magnets, minimises eddy current losses in the rotor and results in an exceptional motor efficiency level of 98%. At 3.5 A/m, the coercivity of ULTRAVAC 44 V6 is approximately one-quarter that of electrical steel, resulting in reduced hysteresis losses.

The Hanau company will also present VACODUR 49, a new Co-Fe alloy developed for high-performance motors and generators. The new alloy features a high saturation level of 2.35 T, and complies with the international standard ASTM A801 Alloy Type 1. The magnetic and mechanical properties of the alloy can be optimised for specific applications by appropriate adjustment of the heat treatment. The outstanding magnetic and mechanical properties of VACODUR 49 make it ideal for both stator and rotor assemblies. While its magnetic properties can be optimised for use in stator applications, yield strength values of up to 400 MPa can be achieved for rotor assemblies, significantly outperforming the magnetic and mechanical properties of classic electrical steel.

During the trade show VAC's staff will be happy to answer any questions and enquiries concerning the current state of research and the new alloys.

VACUUMSCHMELZE GmbH & Co. KG

VACUUMSCHMELZE (VAC) with 1,500 employees in Hanau, designs, produces and markets advanced materials, particularly with magnetic, but also with other physical qualities as well as related products. In 1914, the first vacuum furnace laid the foundation for today's VACUUMSCHMELZE. Industrial vacuum melting techniques for alloys have been in operation since 1923.

VAC Group today achieves annual sales of more than 450 million Euros in over 40 countries and is holder of more than 750 patents. The company is among the world's most highly innovative developers of advanced industrial materials.

VAC's range of products comprises a broad array of advanced semi-finished materials and parts, inductive components for electronics, magnets and magnet systems for use in a wide variety of fields and industries spanning watch-making and medical technology, renewable energies, shipbuilding, automotive and aviation. VAC's custom solutions are developed in close collaboration with the customer, reflecting the company's expertise in materials, applications and state-of-the-art production technology.

Find out more at www.vacuumschmelze.com

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