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High-temperature superconductors (HTS)

Superconductors carry current virtually without loss, so they allow potentially huge savings in generating and transporting electricity. High-temperature superconductors conduct current without resistance at temperatures close to the boiling point of liquid nitrogen (77 Kelvin/-196 degrees Celsius).

E-Power Management

In the E-Power Management growth field, we develop innovative materials and energy-efficient technologies for the electric power value chain. Resource-conserving, carbon-optimized energy generation, conductance and storage, as well as more efficient use of energy, are key building blocks for environmental and climate protection and for feeding the energy needs for the growing world population.

(01) Dr. Michael Bäcker

(Available in German only)

12/02/2016 / 02:26 / DE / Statement



High-temperature superconductors enable different applications for improved electricity transmission as well as for more compact and lighter electric motors and generators.

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(02) Tape respooling machine

12/02/2016 / 02:54 / direct sound / Footage

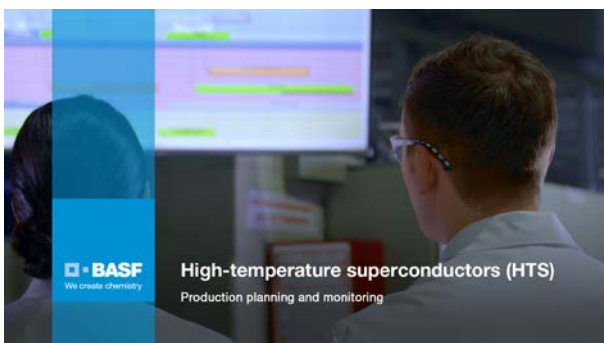


The superconductor bands are manufactured in several manufacturing steps. To ensure that the tape runs in the same direction during each step and that the same end of the tape can be processed first in each step, the tape is respooled.

Superconductors facilitate innovative power engineering systems that operate efficiently with little impact on resources. As the current carrying capacity of superconductors is high compared with copper, extremely compact and lightweight systems become an option in electrical engineering.

(03) Production planning and monitoring

12/02/2016 / 01:50 / direct sound / Footage



Superconductors transmit electric power with negligible line losses and have high current-carrying capacity compared to copper. This will make it possible to generate and transmit electricity in a resource-saving manner in future. For the efficient production of high-temperature superconductors Deutsche Nanoschicht GmbH, a BASF Group company, has developed a unique process.

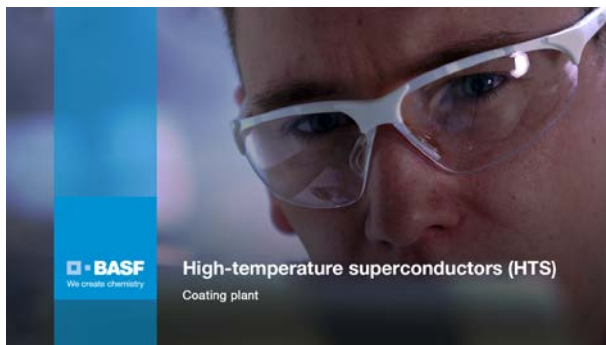
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The manufacture of superconductor tapes proceeds in multiple process steps and at different process speeds. To ensure that these processes can be conducted in parallel and on a continuous basis, meticulous production planning and monitoring are of great importance.

(04) Coating plant

12/02/2016 / 03:56 / direct sound / Footage



Very thin films of a superconducting material are applied to a metal strip in a continuous process by a technique called chemical solution deposition. This process involves coating the tape with a thin layer of a solution using a special printing head. The applied solution then dries to form a film.

In contrast to other, physical methods, the chemical process requires neither a vacuum nor a clean room environment. This provides a decisive advantage for the production costs of the superconducting wires.

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(05) Calcining plant

12/02/2016 / 01:36 / direct sound / Footage

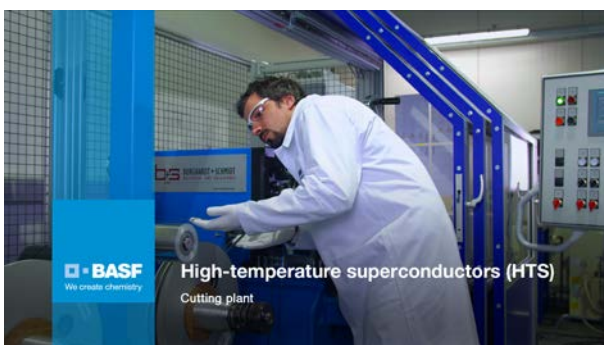


The layers applied by means of chemical solution deposition are chemically converted by the application of heat, and are fired to form ceramic layers. The ceramic layers produced in this way have superconducting properties because they feature flawless crystal orientation.

The coating consequently features the ideal electrical properties of a single crystal but does not show its mechanical properties such as brittleness or impact sensitivity.

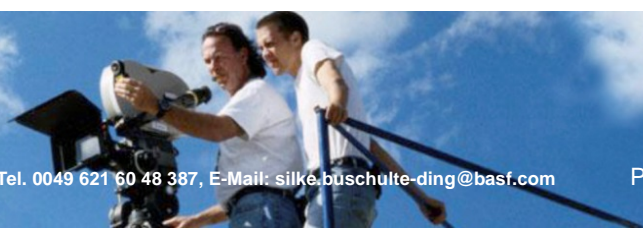
(06) Cutting plant

12/02/2016 / 03:24 / direct sound / Footage



Once all coating processes have been completed, the tape is cut to the customer-specific width using cutting rollers.

Superconductor technology is particularly important for manufacturers of generators and motors, and for cable and mains supply networks for metropolitan areas. Among other things, it enables energy to





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be harvested highly efficiently from renewable resources by means of wind and hydro power generators, especially in offshore wind farms.

