

THEVA succeeds in continuous tape coating

On June 19th, 2002 the first meter of RBCO has been successfully fabricated by THEVA in a continuous deposition mode using thermal co-evaporation.

The success is a result of three years of development of the new technology within the framework of the European READY project. It clearly demonstrates the feasibility of thermal co-evaporation for producing second generation coated conductors.

The first sample of one meter length was superconducting at 80 K. Immediately prior to the crucial experiment transition temperatures of 89 K and critical current densities as high as 0.8 MA/cm² have been achieved with the same tape coating system but in a static deposition mode where the tape transport was switched off. Although this result should be regarded preliminary, the latest experiment has answered a lot of open questions.

During deposition the tape passes the HTS deposition zone 16 times and is thus cycled many times between ambient and deposition temperature (680°C). It is bended and driven over many rollers and oxygen loading takes place within a minute. All these crucial steps have been passed successfully and further improvement is expected with a proper choice of deposition parameters.

Prior to the HTS deposition step 25 meters of high quality ceria buffer have been deposited continuously on RABiTS tape. This tape will be used to further optimize the HTS deposition process.

Latest news:

Due to the moving of THEVA into its new headquarters, the deposition system has been switched off, dismantled and set up again at the new premises at the begin of July. Within two weeks it was operational again and after some static tests which reproduced the previous results one meter of RABiTS tape has been coated with 300 nm of YBCO in the continuous deposition mode. This second attempt resulted in a superconductor tape with 0.2 MA/cm² at 77 K from end to end. The somewhat lower jc compared to the static mode originates probably from a temperature gradient at the outermost section of the heater where the tape enters the deposition zone. With a better control of this parameter we are confident to obtain similar results as for static depositions.

Since all features of the system are properly operating and appropriate for long term deposition the scale up of film thickness and tape length is merely a matter of extending the deposition time. Films up to several micron thickness have been successfully fabricated previously in static test runs, so that we don't expect principal problems in the scaling up procedure.

The results will be presented at the ASC 2002 in Houston (August) and the ISS 2002 in Yokohama in November.

At THEVA the first meter of coated conductor using thermal co-evaporation has been deposited.

25 meters of ceria - buffered tape in line for HTS deposition

One meter of tape with 0.2 MA/cm² achieved