Test Results from Siemens Low-Speed, High-Torque HTS Machine and Description of Further Steps Towards Commercialization of HTS Machines

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Abstract - With extensive testing of the 4MW 120rpm HTS machine connected to a standard Siemens converter this first development stage for a basically new technology is concluded. The most innovative part of the machine, the HTS excited rotor, outperformed our expectations and demonstrated our capability to design, develop and build successfully such a technically challenging component. This could only be achieved on the base of a thorough understanding of the innovative material and its behaviour including practical handling experience, the ability to simulate 3D electromagnetics including transients, and finally transfer of the scientists' knowledge to a qualified manufacturing process. Equally important are the improved capabilities of critical component suppliers, *e.g.*, for superconducting tapes and compact cryo-refrigerators. However, the transition of a technology into highly reliable industrial products does require more than technical mastering of the machine. Based on outstanding technical test results presented above, the next step can be addressed in the future: the product development. Some thoughts will be presented regarding the needs of application fields and market-oriented development, as the market is not "waiting for HTS". If HTS technology is seen as one key technology for a sustainable, material saving and energy efficient future, it certainly needs more effort, even at the 100th anniversary of superconductivity.

Keywords - High-temperature superconductors, HTS synchronous machines, HTS motor

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