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New Horizons for PLD-based Technology of 2G HTS Tapes

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***Abstract*—Pulsed laser deposition (PLD) technique is an extremely efficient tool for deposition of inorganic thin films with multi-element chemical composition, complex crystal structure and specific defect landscapes. Although PLD is widely used in laboratories, there were no successful examples of PLD mass production so far. In this light, utilization of PLD technology for pilot scale reel-to-reel fabrication of high-temperature superconducting wires of second generation (2G HTS) is an exceptional case. Hundreds of kilometers of 2G HTS tapes were produced by PLD recently, making it an enabling material for ultra-high field fusion magnets with operating temperature around 20K. Material demand for emerging fusion industry became a main driver for 2G HTS production scale-up efforts by companies developing various MOCVD, RCE, MOD and PLD techniques.**

Faraday Factory Japan (FFJ) is a new industrial and R&D entity that sets an ambitious goal to bring annual production beyond 1000 km/12mm level, serving the market with hundreds of megaAmpere-meters (MAm) of HTS tape with typical minimum Ic level of 200 A/4 mm at 20K, 20T. Multiple industrial PLD units operating 24/7 are the essence of FFJ technological process. Further development of advanced PLD chambers and new platforms of excimer lasers is a critical issue for PLD-technology survival in competition with other manufacturing techniques. In this talk we will present our vison of the new Factory space, its equipment, utilities, operation and management, which can be considered as a standard production unit for further multiplication.

***Keywords (Index Terms)*—High-temperature superconductors (HTS), pulsed laser deposition, coated conductors, HTS for fusion**

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