MT 26
International Conference on Magnet Technology
Vancouver, Canada | 2019

Contribution ID: **1334** Type: **Poster Presentation**

Wed-Mo-Po3.13-12 [120]: A Feasibility Study to Apply the Bitter Magnet to Electric Power Devices

Wednesday, 25 September 2019 09:30 (1h 45m)

The "Bitter"magnet has been serving high field science community over decades, since its first implementation by MIT in the 1930s and its variation of the Florida Bitter by the National High Magnetic Field Laboratory in the 1990s. With a proper water-cooling environment, average current density of such a bitter magnet reaches ˜600 A/mmˆ2 with a field generation capacity of >40 T. This paper reports our initial efforts to apply the Bitter magnet to electric power applications with focus on: (1) air-cooled rotating machine such as axial-flux-type synchronous motor; and (2) oil-cooled stationary machine such as transformer. Due to the high-energy-density feature of the Bitter magnet, the new power machines may be substantially more compact than the conventional counterparts. Also, owing to the rigid structure of the Bitter windings, we expect lower vibration noise in operation of such machines. In spite of these benefits, mainly due to the requirement of high pressure coolant, the overall system's efficiency must be carefully examined. As the first step of our research, this paper reports: (1) key concept of the Bitter magnet electric machine; (2) preliminary design of selected machines; and (3) performance estimation of the newly designed machines by use of finite element method.

Acknowledgement
This work was supported by the National Research Foundation of Korea as a part of Mid-Career Research Program (No. 2018R1A2B3009249).

Primary author: Mr AN, Soobin (SeoulNationalUniversity)

Co-authors: KANG, Jae-Woo (Seoul National University); BONG, Uijong (Seoul National University); HAHN, Seungyong (Seoul National University)

Presenter: Mr AN, Soobin (SeoulNationalUniversity)

Session Classification: Wed-Mo-Po3.13 - Motors X