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AC loss measurement of high temperature superconducting magnets KICHIJI HATANAKA, MITSUHIRO FUKUDA, TETSUHIKO YORITA, TAKANE SAITO, JINTA NAKAGAWA, Research Center for Nuclear Physics (RCNP), Osaka University, YASUHIRO SAKEMI, Cyclotron and Radioisotope Center (CYRIC), Tohoku University, KOJI NODA, National Institute of Radiological Sciences (NIRS), TAKEO KAWAGUCHI, KT Science Ltd. — Twenty years have passed since the discovery of high temperature superconductivity. However, there not have been many applications of high temperature superconducting (HTS) wires to magnets. In order to investigate the applicability of HTS wires at higher frequencies, two sets of air core magnets were fabricated using a Bi2223 wire and AC loss was measured at 10-21 Hz. Each magnet consists of two coils. Each coil consists of 3 double pancakes and the number of turns is 420 in total. The critical currents were measured at 77 K to be 56 - 62 A for double pancakes and 40 - 43 A after assembling to form coils. The maximum current is assumed to be 200 A at 20 K. Magnets were installed in a cryostat and cooled to 20 K. The critical currents were measured to be 257 A and 282 A for Bx-coil and By- coil, respectively, at 20K. The AC loss was measured at 10, 15 and 21 Hz. AC loss per cycle is independent of the frequency. It is consistent with the hysteresis loss. The loss depends on the 2.4-th power of the applied current.

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