The ARES Cavity for the KEK B-Factory, K. AKAI, N. AKASAKA, E. EZURA, T. KAGEYAMA, H. MIZUNO, F. NAITO, H. NAKANISHI, Y. TAKEUCHI, Y. YAMAZAKI, KEK; T. KOBAYASHI, Institute of Applied Physics, Tsukuba Univ. - The ARES (Accelerator Resonantly coupled with Energy Storage) scheme is an effective countermeasure against the coupled-bunch instability due to the accelerating mode for the KEK B-factory. The ARES structure is a three-cavity system operated in the $\pi/2$ mode, where an accelerating cavity is coupled with an energy storage cavity via a unexcited coupling cavity. The energy storage cavity is a large cylindrical cavity operated in the TE013 mode, and the accelerating cavity itself employs a new HOM-damping scheme of Quadrupole Counter-Mixing (QCM) choke structure. In addition, the coupling cavity is equipped with a damper to reduce the impedances of the parasitic 0 and π modes. This paper describes the RF design and characteristics of the first high-power ARES cavity.