Size, Shape and Impurity Effects on Superconducting critical temperature.\textsuperscript{1} MASAKI UMEDA, MASARU KATO, Osaka Prefecture University, OSAMU SATO, Osaka Prefecture University Colledge of technology — Bulk superconductors have their own critical temperatures $T_c$. However, for a nanostructured superconductor, $T_c$ depends on size and shape of the superconductor \cite{1}. Nishizaki showed that the high pressure torsion on bulks of Nb makes $T_c$ higher, because the torsion makes many nano-sized fine grains in the bulks \cite{2}. However the high pressure torsion on bulks of V makes $T_c$ lower, and Nishizaki discussed that the decrease of $T_c$ is caused by impurities in the bulks of V. We studied size, shape, and impurity effects on $T_c$, by solving the Gor’kov equations, using the finite element method. We found that smaller and narrower superconductors show higher $T_c$. We found how size and shape affects $T_c$ by studying spacial order parameter distributions and quasi-particle eigen-energies \cite{3}. Also we studied the impurity effects on $T_c$, and found that $T_c$ decreases with increase of scattering rate by impurities. \cite{1} H. Suematsu, M. Kato and T. Ishida, J. Phys.: Conf. Ser. 150 (2009) 052250. \cite{2} T. Nishizakiet al., Physica C 493 (2013) 132. \cite{3} M. Umeda, M. Kato, O.Sato IEEE Trans. Appl. Supercond. 26 (2016) 8600104.

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