Structural-Microstructural Characteristics and its Correlations with the Superconducting Properties of in-situ PIT Processed MgB$_2$ Tapes with Ethyltoluene and SiC Powder added ANJANA ASTHANA, Superconducting Materials Center, National Institute for Materials Science, 1-2-1, Sengen, Tsukuba, Ibaraki, H. YAMADA, N. UCHIYAMA, Central Japan Railways Company, Ooyama, Japan, A. MATSUMOTO, H. KITAGUCHI, Y. MATSUI, H. KUMAKURA, Superconducting Materials Center, National Institute for Materials Science, 1-2-1, Sengen, Tsukuba, Ibaraki — The structure and microstructures of pure MgB$_2$, ethyltoluene and ethyltoluene + SiC added MgB$_2$ tapes have been investigated by using selected area electron diffraction, bright field, dark field and high resolution electron microscopy. As reported, the Jc values of the ethyltoluene and ethyltoluene + SiC added MgB$_2$ tapes are much higher than the pure MgB$_2$ tape sample. Analysis of the microstructures shows that pure MgB$_2$ tape sample consist of grains of 100-200nm. With the addition of ethyltoluene and ethyltoluene + SiC to the starting powder of in situ processed MgB$_2$ tapes, the grain size decreases drastically to an average size of about 20-50nm. The higher Jc value of the ethyltoluene and ethyltoluene + SiC added MgB$_2$ tapes as compared to the pure MgB$_2$ tapes has been attributed to the decrease in grain size and better connectivity of the grains and also presence of pinning centers as some precipitates and Mg$_2$Si particles of size less than 100nm.