

Extremely red K-[3.6] galaxies: a candidate passive population at $z \sim 6$ Ken Mawatari¹, Toru Yamada¹¹ *Tohoku University***Abstract**

With a combination of ultra deep and wide infrared survey data from the *Spitzer* Extended Deep Survey (SEDS) and the UKIRT Infrared Deep Sky Survey, we selected objects satisfying $K - [3.6] > 1.3$. From spectral energy distribution (SED) fitting, we found our color selection identifies a variety of galaxy types, including (1) post-starburst galaxies at $z \geq 5$, (2) dusty star-forming galaxies at $z < 4$, (3) nebular line emitters at $z > 4$, and (4) Type-2 AGNs. Significant fraction of red $K - [3.6]$ galaxies are identified as AGNs or dust obscured galaxies at $z = 1 - 4$. While we failed to isolate significant fitting solutions individually for the remaining red galaxies, we identified some candidates of passive galaxies at $z \geq 5$ which are characterized by relatively blue $[3.6] - [4.5]$ colors. Stacked SED of the three candidates in the SEDS UDS field is well fit by the post-starburst template with $M_* = (5.8 \pm 0.8) \times 10^{10} M_\odot$ at $z \sim 6$. The stellar mass density of these post-starburst galaxy candidates, $(8.2 \pm 4.8) \times 10^{-7} M_\odot \text{Mpc}^{-3}$, is much lower than that of star-forming galaxies, but the non-zero fraction suggests that initial star-formation and quenching have been completed by $z \sim 6$. We also discuss this observational results with the recent semi-analytic model galaxies.