X10a The stellar populations of Lyman Break Galaxies at $z \sim 5$

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We present the results of SED fitting for Lyman Break Galaxies at $z \sim 5$ in the GOODS-N and its flanking fields. With the publicly available IRAC images in the GOODS-N and the IRAC images we observed in the flanking fields, we constructed the rest-frame UV-optical SEDs for a large sample (~ 100) of UV-selected galaxies at $z \sim 5$. For this sample, we fit the observed SEDs with population synthesis models. The comparison of the distribution of the parameters for our sample with that for the $z = 2-3$ samples shows the increase of the stellar mass from $z \sim 5$ to $z = 2-3$ and that the $z \sim 5$ galaxies are relatively younger than for the $z = 2-3$. We found that the color excess of our sample is larger, and thus, the star formation rate is higher than in $z = 2-3$ galaxies. We conclude that the galaxies at $z \sim 5$ are undergoing explosive star formation making them dusty. The results for our sample are also compared with other works for $z = 5-6$ galaxies. The stellar mass function of our sample agrees with that for the IRAC-selected sample of Elsner et al. (2007) but disagrees with that for the K_s-selected sample of Drory et al.(2005). The stellar mass function of our sample and theoretical models agree in the massive end but disagree in the low-mass end. By integrating down to $10^8 M_\odot$, the cosmic stellar mass density at $z \sim 5$ is calculated to be $7 \times 10^6 M_\odot \mathrm{Mpc}^{-3}$, i.e., about 1.4% of the local stellar mass density was assembled in the first 1.2Gyr. We also compare the mass density of our sample with other observations and theoretical predictions.