Construction of a new galaxy spectral energy distribution model consistent with the evolution of dust

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The spectral energy distribution (SED) of galaxies is affected by the evolution of dust in the galaxy ISM. For example, dust grains scatter and absorb ultraviolet (UV) photons emitted from stars and re-emit the energy at infrared (IR) wavelengths. Also hydrogen molecules, which have an important roll in the star formation, are formed on the dust grain surface. The galaxy SED model should, then, treat the evolution of dust size/mass distribution. However, previous SED models have only used empirical properties for dust and have not considered the evolution of dust. In this work, we construct a new galaxy SED model based on our dust evolution model (Asano et al., 2013a, b, 2014) consistent with chemical evolution. To reduce the computational cost, we adopted the mega-grain approximation and one-dimensional galaxy approximation (Inoue 2005). With these approximations, we can solve the radiative transfer easily and provide SEDs and attenuation curves of galaxies. This SED model can used to fit a galaxy at any evolutionary phase.