WISE J180956.27-330500.2:
A star with a recently-formed thick dust envelope

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WISE J180956.27–330500.2 (hereafter WISE J1810) was discovered in the course of studying the WISE Preliminary Source Catalog by Gandhi et al. (2012, ApJ 751, L1) as an object showing a peculiar infrared SED with a very deep depression at WISE 3.4 μm band.

We found that this peculiar SED of WISE J1810 can be understood as a transient effect induced by an expanding and cooling dust envelope that was formed recently by the ejection of an enormous amount of dust. The mass ejection took place in late 1990's. We suspect that the star is possibly the first example of an AGB star currently ongoing an episodic mass loss after a thermal pulse in the AGB phase, unlike Sakurai's object that underwent an episodic mass loss during the white dwarf phase.

A DDT observation with Herschel/PACS and SPIRE to measure the fluxes at wavelengths between 70 and 500 μm, and a deep photometry in J, H, Ks bands with the IRSF were carried out in October 2012. The SED fitting by the spherical dust shell model concluded the total dust mass in the shell is as much as $\sim 10^{-3}$ M_{sun}. Mid-IR spectroscopy to determine the chemical composition of the dust shell was made with Subaru/COMICS in July 2013 and is being analyzed.

We believe that WISE J1810 is a key object to understand (1) how the mass loss takes place after the thermal pulse, (2) what kind of dust is formed in such events, and (3) how such event contributes to the dust budget in the universe. The latest status of the study of the object will be presented.