Can Water Ice at Lunar Poles be Detected by Gamma-Ray Spectrometer on SELENE

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The Clementine over the Moon reported that the signature of lunar ice deposits permanently in shaded regions in the south pole region. Recently, the neutron spectrometer onboard Lunar Prospector revealed dips in counting rate of epithermal neutrons corresponding to polar regions, which indicates the presence of water ice with a high probability. However, after the one and half year mission of Lunar Prospector, the controlled crash of the spacecraft into a crater in the south pole region showed no observable signature of water ice. Gamma-ray spectrometer (GRS) with high sensitivity and energy resolution will be boarded on the Japanese lunar orbiter SELENE. It has an excellent capability to detect the prompt gamma-ray line from hydrogen of water ice between the strong peaks of Si and Al lines. The GRS will make the first time detection of water ice allegedly deposited at lunar poles, and will determine the locations and the amount of water ice on the surface.