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## Hayabusa2/NIRS3 spectral observations of the surface of asteroid (162173) Ryugu

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On 27 June 2018, JAXA's Hayabusa2 spacecraft arrived at a distance of 20 km from its target 162173 Ryugu, a sub-km sized asteroid in the near-Earth space, and began its 1.5-year asteroid proximity operation. The NIRS3 instrument onboard Hayabusa2 acquired near-infrared (1.8-3.2  $\mu$ m) reflectance spectra from the surface of Ryugu, to characterize and map its surface composition. The NIRS3 observations show that in this spectral range Ryugu is the darkest object to be observed up-close by a visiting spacecraft, and it is even darker than the nucleus of comet 67P/Churyumov-Gerasimenko. A weak, narrow absorption feature centered at 2.72  $\mu$ m is detected across the entire observed surface, indicating that hydroxyl (OH)-bearing minerals are ubiquitous on the surface of Ryugu. The intensity of the OH feature and the extremely low albedo illustrate that the spectra of Ryugu are different from those of unheated phyllosilicate-rich carbonaceous chondrites. The best analogs are currently thermally- and/or shock-metamorphosed hydrous carbonaceous chondrites, and/or carbon-rich hydrated primitive materials exposed to some degree of space weathering. We will present the results of the analysis of the NIRS3 spectra, including the high-resolution data obtained during the descent operations.