

Low-dispersion spectroscopic observations of comets C/2012 S1 (ISON) and C/2013 R1 (Lovejoy) by the Subaru Telescope

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Comet C/2012 S1 (ISON) was discovered at 6.3 au pre-perihelion from the Sun and expected to be very bright at the perihelion passage ($q = 0.01247$ au) on November 28, 2013. This comet became brighter between October and November 2013 as expected. However, the comet disintegrated around the perihelion passage. Fortunately, at the same period, comet C/2013 R1 (Lovejoy) was also so bright that we could observe both comets to investigate their chemical compositions. Comet C/2013 R1 (Lovejoy) was discovered at a heliocentric distance of $R_h = 1.94$ au pre-perihelion on UT 2013 September 7. We performed low-dispersion optical spectroscopic observations of both comets with the FOCAS instrument mounted on the 8-m Subaru Telescope on UT 2013 October 31. At that night, the visual brightnesses of these comets were nearly the same ($\sim 9^{\text{th}}$ magnitude). We could obtain the long-slit spectra of these comets with the spectral resolving power of ~ 1000 . We discuss spatial profiles of cometary molecules and dust grains in our presentation. We also present the mixing ratios of cometary molecules in their comae.