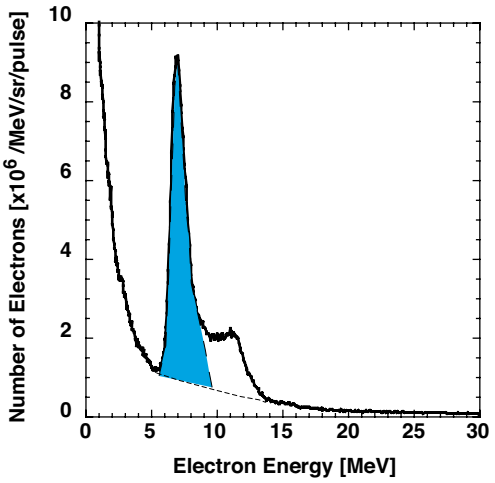
Monoenergetic Electron Beam Generation in Laser-driven Plasma Acceleration

- A step toward a compact accelerator -

The realization of a compact accelerator based on laser-driven plasma acceleration is expected owing to the high acceleration field which is 1000 times higher than that of conventional accelerators. So far, a monoenergetic electron beam has not been obtained in laser-driven plasma acceleration. We generated a monoenergetic electron beam for the first time. A dense gas jet was irradiated by a 100-mJ, 50-fs laser pulse with the wavelength of 800 nm. The monoenergetic electron beam with the energy of 7 MeV has been obtained in the acceleration length of 0.5 mm from the plasma with the electron density of 10^{20} cm^{-3}. (Figure) The monoenergetic electron beam generation is a breakthrough in realizing a compact laser-driven plasma accelerator.



An energy spectrum of a monoenergetic electron beam obtained in laser driven-plasma acceleration

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Nanotechnology and Materials Science & Technology

Elemental Mapping with Atomic Sensitivity

- the Ultimate Analysis -

Advances in nanotechnology increasingly rely on characterization tools with atomic resolution. Chemical information on hetero-geneous nanostructures in particular is more and more crucial for diagnosing and predicting properties of novel functional nanodevices. We have developed an analytical electron microscope enabling elemental analysis at the sub-nanometer region which is a powerful tool to determine the atomic structures in nano-materials. Single-atom identification has been demonstrated by this apparatus for the chemically decorated carbon nanostructures with the highest confidence level.

A dedicated scanning transmission electron microscope with atomic sensitivity

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