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Spatio-temporally resolved spectroscopic investigations of nanostructures by correlation nanoscopy

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As an era of nano science approaches, the understanding on the shape and optical properties of various materials in a nanoscale range is getting important more seriously than ever. Accordingly the development of high spatial-temporal-spectral resolution measurement tools for characterization of nanomaterials/structures is highly required. Generally, the various properties of sample can be measured independently, e.g. to observe the structural property of sample, we use the scanning electron microscopy or atomic force microscopy, and to observe optical property, we have to use another independent measurement tool such as photoluminescence spectroscopy or Raman spectroscopy. In the case of nano-materials, however, it is very difficult to find out the same position of sample at every different measurement processes, and the condition of sample can be changed by the influence of first measurement. The correlation nanoscopy, which can simultaneously measure the two or more information of sample, is a solution of this problem. Near-field scanning optical microscopy is a good example of correlation nanoscopy. In this talk, I will present about our developed various types of high spatial-temporal-spectral resolution correlation nanoscopy such as sensitivity-maximized near-field scanning optical microscope, scanning absorption nanoscopy, ultraviolet (UV) tip-enhanced Raman spectroscopy, and time-resolved UV near-field scanning optical microscopy.

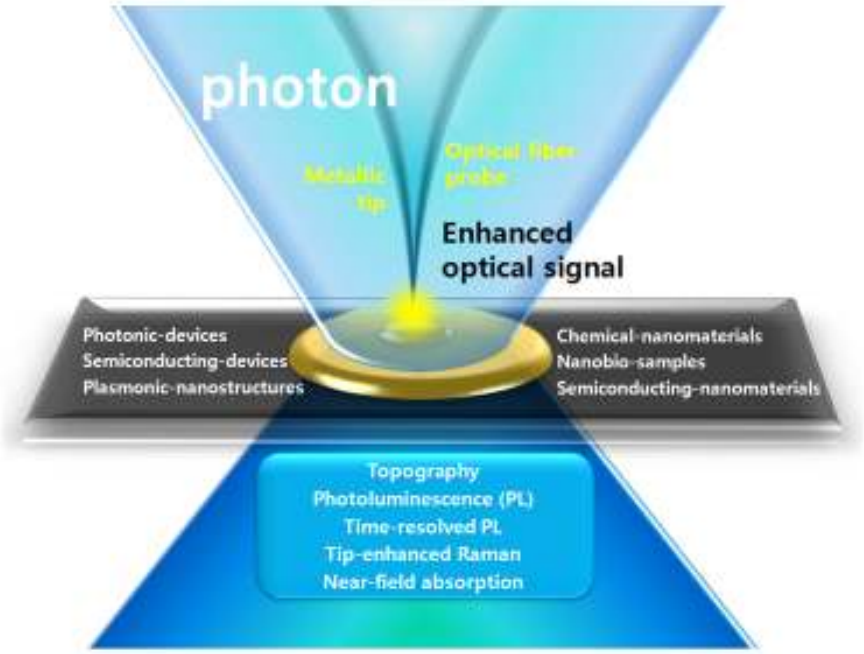

Fig. 1. Conceptual description of correlation nanoscopy based on scanning probe method.