The Impact of Advanced 3GeV Synchrotron Facility in Materials Engineering as well as Industrial Science and Technology - Tangible and Intangible Impacts of SLiT-J Project -

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The 1990's saw scientific communities worldwide push for much higher brightness of Synchrotron Radiation (SR) light sources. Japan was no exception and responded with the construction of SPring-8 (RIKEN SPring-8 Center at Harima, Japan) addressing the hard x-ray spectral range and UVSOR-III (Institute for Molecular Science at Okazaki, Japan) for the extreme ultraviolet region. However, Japan has not filled the gap in spectral range with a state-of-the art soft X-ray SR facility, a spectral range covered by facilities worldwide.

In the 2000's, there have been many medium energy, 3GeV, SR facilities constructed whose success has relied on technology first developed in Japan. These emerging SR facilities are making remarkable progress in promoting industrial utilization through industry-university collaborations, which have led to new innovations in science and technology. As a result, it is widely recognized that "advanced soft and hard synchrotron light is powerful tool for industrial R&D".

The industrial applications are now spreading out beyond the initial applications to industries such as heavy industry, electronics, soft matter, batteries, food, the car industry, the pharmaceutical industry, and others.

As with technology now commonplace in medium energy SR sources Japan has been the world leader in SR based "industrial applications". In early days, pioneering trial utilization by industry focused on individual analytical services. Then, the successes in "industrial applications" led to strengthening the image of "industry applications" = "analytical service".

In this background, the dialogue about SR science among the stakeholders in the scientific community with regard to large facilities was largely based upon "curiosity driven" viewpoint with few "technology driven" viewpoints. I may say the same situation can be described by the exchange of the term "industrial applications" with "application for materials engineering".

Last year, "High brilliance light source project to make a new epoch of scientific and technological nation" was adopted as one of the "Road Map 2017" of Ministry of Education, Culture, Sports, Science and Technology(MEXT). Since 2011, the SLiT-J (Synchrotron Light in Tohoku Japan) project has been discussed among universities and industries as well as Tohoku Economic Federation and the Prefectures in Tohoku area. This year, MEXT included "The promotion of next generation SR facility by the public and private sectors partnership" in 2018 budget. The "industry-university collaboration" is certain to attract attention in both the curiosity driven and technology driven communities. However, the industries planning to join the next generation 3GeV SR project want a new scheme for the use of large facility applications and have been examining the most advanced x-ray techniques for solving core problems of industries by involving new comers as well as existing industrial players. They also discuss implications of a new pillar for the science system with respect to a large facility. In this background the impact of an advanced 3GeV synchrotron facility in materials engineering as well as Industrial Science and Technology will be discussed.