Nano－Metallurgy for High Temperature Metals　　Prof. **Kenji ABIKO**

【Staff　Members】

Visiting Prof. Kenji ABIKO,　Visiting Assoc. Prof. Toshimitsu TETSUI,
Visiting Researcher. Hiroyuki NITTA

【Research Activities】

In 2004 our research laboratory was established. We had promoted the project of "Science of ultrahigh-purity base metal" supported by CREST (Core Research for Evolutional Science and Technology) of Japan Science and Technology Corporation (JST) from fiscal 1996 to 2000. Since fiscal 2001 (~ 2006) we have played a leading role in the ultrahigh-purity unit of "the nano-metal technology project" in the nano-technology program by NEDO. Furthermore, in 2004 we pursued the study of "Development in technology to put high-purity Cr-Fe system alloys to practical use" supported by NEDO. Moreover, we held the international symposium on "How to discover innovative High Temperature Metals for Energy Industries in the 21st Century" in Tokyo in May, 2004, and also "the 10th international conference on Ultra-high Purity Base Metals (UHPM-2004)" at the National Institute of Standards and Technology (NIST) in USA in December, 2004.

In fiscal 2004 we made 14 oral reports in the international conference "UHPM-2004" above and 16 oral reports at the 134th and 135th meetings of the Japan Institute of Metals. A part of our research results were reported two times in TV and two times in the press, and exhibited at the "Nikkei Nano-Tech Fair 2004" and "NEDO nano-tech 2005" in Tokyo.

(Plan】

We have done the following research on ultrahigh-purity metals and alloys:

(1) Ultra-purification of base metals such as Fe, Cr, Ni, Co and Ti, and those alloys.
(2) Development of trace analysis techniques for impurities at the level of 0.01 ppm order.
(3) Inquiry into inherent properties of ultrahigh-purity metals and alloys, and the effects of alloying elements and the influence of impurity elements on the properties.

and then have conceived the concept of new metallurgy, "Nano-metallurgy."

Our laboratory continues to build up "nano-metallurgy" by ultrapurifing various metals and alloys and revealing their new properties, and also play a leading role in the development research of innovative metals including high temperature metallic materials on the national projects above by making full use of the results obtained. In addition one of our plans for the practical application of ultrahigh-purity metals is to make use of them as the international standard materials.