



## Research Life in NIMS

Superalloy Division, Institute of Metal Research,  
Chinese Academy of Sciences

Chuanyong CUI

My name is Chuanyong CUI. I came from Shenyang (China). I was very much pleased to write a short essay for “Habataku”. I do have a great sense of respect for Japan and the Japanese people, and after 7 years of my stay it becomes more than words, if you think in a different way, what holds you here? It would be impossible to squeeze all of the last 7 years of my life using a couple of sentences.

I first heard about Tsukuba as the “City of Science” when I was a student at Institute of Metals Research (IMR), China, and wished to visit there someday. I came to Tsukuba in July, 2002 after I got my Ph.D degree. I am honored to live and do research in NIMS. NIMS has an excellent research system which offered me a lot of freedom in research, an international environment, and a fantastic working atmosphere with cutting edge facilities and an English support system (kind and friendly administrative staffs) to do both exploratory and fundamental researches. I really enjoyed my staying and the freedom. This summer is also a turning point of my research life: I will leave NIMS to join IMR in China. I feel that this is a great opportunity for me to honor NIMS for its nice research system, which institute not only provides career position for many young scientists from different countries but is also a place to develop friendships among them having different cultures, characters, and attitudes.

The area of my research in NIMS is the evaluation of Ni<sub>3</sub>Al thin foils and the development of new turbine disk alloys. Since July, 2002, I worked as a NIMS post-doctoral fellowship under the supervision of Dr. Toshiyuki HIRANO. He gave me an opportunity to enter the NIMS nucleus, for which I am always grateful to him. My research objectives were evaluation and improvement of the mechanical properties of heavily cold-rolled Ni<sub>3</sub>Al thin foils (less than 100 μm), especially its ductility. By studying on the notch fracture behaviors and on the room-temperature ductility of cold-rolled and recrystallized Ni<sub>3</sub>Al foils, I found a method by controlling the grain boundary character distribution of boron-free Ni<sub>3</sub>Al foils to improve its room-temperature ductility in air<sup>(1)</sup>. These results are very interesting and useful for both fundamental research and future applications.

Since July, 2004, as a Research Fellow of “HTM 21 Project” in the High Temperature Materials (HTM) Center, I was assigned to design new disk superalloys. We proposed a new idea of combining two types of  $\gamma/\gamma'$  alloys (Ni-base and Co-base superalloys)<sup>(2)(3)</sup>. Based on this innovative concept, we have succeeded in developing a new kind of Ni-Co base C&W alloys (termed as TMW) with the world’s highest heat resistance of 998 K, exceeding that of the existing high strength C&W Ni-base alloy U720Li by 50 K. Under a commission from Japan’s New Energy and Industrial Technology Development Organization (NEDO), we produced successfully a real-scale pancake by TMW alloys in a joint project with Mitsubishi Materials Corporation. In the near future, TMW alloys are expected to be made into turbine disks and compressor blades for aircraft engines and industrial gas turbine applications.

Life in Tsukuba is calm, safe and wonderful. At the time of our arrival, I felt that Tsukuba is the countryside, since I could only see many tall, wild trees and few high buildings. This is the natural aspect of Tsukuba. The city looks more like a big garden with various trees, flowers, and greenbelts that show their multicolored beauty in all the seasons. We delight in taking a walk in the parks or along the sidewalks during our spare time to enjoy the natural scenery. Another unique feature of Tsukuba is its scientific atmosphere: several tens of institutes are gathered, covering a wide range of research fields. Visiting these institutes on their public open days is always exciting for my family, especially my lovely daughter. Third, since many foreign researchers reside here, different cultures come together as in “a melting pot.” It is possible to try foods with different tastes. I can easily find here diverse restaurants characteristic of Japan, China, Italy, Iran, Korea, Thailand, and many other countries.

During my staying in Japan, I also meet a number of nice people who help me a lot not only with my research but also with my daily life. I have been deeply impressed by the people here for their kindness, honest and diligent. Even though the Japanese are known around the world as a polite and responsible nation, I was honestly surprised to notice how caring they are for people around them. And they obey the public order, for example, the traffic regulations. It would be great if Chinese could learn from the Japanese in this sense.

Last but not least, I would like to have this opportunity to express my heartfelt gratitude to Dr. Toshiyuki HIRANO, Dr. Hiroshi HARADA, Dr. Masahiko DEMURA and Dr. Yuefeng GU.

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(Superalloy Division, IMR, Chinese Academy of Sciences, 72 Wenhua Road, Shenyang, Liaoning, China, 110016)