

Principal Researcher	Kiyohito Ishida			Number of Researchers	4	
Research Institution · Department · Title	Professor, New Industry Creation Hatchery Center, Tohoku University			Location of Institution	Sendai	
Title of Project	Development of new Invar-type alloys by controlling stress-induced transformation of thermoelastic martensite and its industrial application					
Abstract of Research Project	It is well-known that the coefficient of thermal expansion (CTE) of alloy is inversely proportional to its melting temperature. This empirical rule suggests that thermal expansion is one of the intrinsic properties of a material which is very difficult to control. Invar alloys discovered in the Fe-Ni alloys in 1896, which have been developed based on magnetic transformation, is only exception. Our group has found that the low thermal expansion (LTE) can be obtained through the microstructural control of stress-induced transformation of thermoelastic martensite by cold-working the shape memory alloys. The objective of this project is to clarify the mechanism and to establish the fabrication process of this new type of LTE material, which should be applied to practical use.					
References	<p>R. Kainuma, J.J. Wang, T. Omori, Y. Sutou and K. Ishida, " Invar-type Effect Induced by Cold-rolling Deformation in Shape Memory Alloys " Appl.Phys.Lett., inpress</p> <p>K. Oikawa, L. Wuff, T. Iijima, F. Gejima, T. Omori, A. Fujita, K. Fukamichi, R. Kainuma and K. Ishida, " Promising Ferromagnetic Ni-Co-Al Shape Memory Alloy System " Appl.Phys.Lett., 79 (2001) 3290-3292</p> <p>A. Fujita, K. Fukamichi, F. Gejima, R. Kainuma and K. Ishida, " Magnetic Properties and Large Magnetic-field-induced Strains in Off-stoichiometric Ni-Mn-Al Hensler Alloys " Appl. Phys. Lett., 77 (2000) 3054-3056.</p>					
Term of Project	Fiscal years 2002-2006. (5years)					
Budget Allocation (in thousand of yen)	FY2002	FY2003	FY2004	FY2005	FY2006	TOTAL
	29,400	15,400	16,100	14,700	9,000	84,600
Homepage Address	http://www.material.tohoku.ac.jp/~seigyo/English/e-index.html					