# Development of Extremely Thermostable DNA Ligase for Genetic Diagnosis

The ligase chain reaction (LCR) is a DNA amplification technique which can be used to detect trace levels of known nucleic acid sequences. Use of a thermostable DNA ligase allows the LCR reaction to be cycled easily in conventional thermocyclers. We have developed an extremely thermostable DNA ligase (*Ape* ligase) from a hyperthermophilic archaeon *Aeropyrum pernix* K1. The new ligase remained stable for ~1 h at 100 ºC, and the half-life was about 1 h even at 105 ºC. It will provide enhanced product yields and shorter diagnostic times in the LCR reaction.
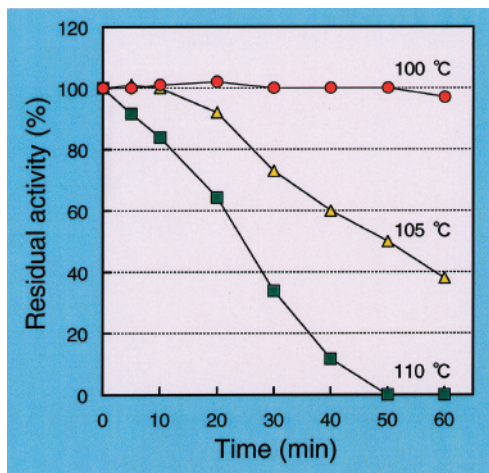
High thermostability of the Ape ligase we have developed

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AIST Today Vol. 3, No.12 (2003) 22

Information and Communication Technology

Lossless Bi-level Image Compression Method Adopted in the International Standard (ISO/IEC 14492 Amd2)
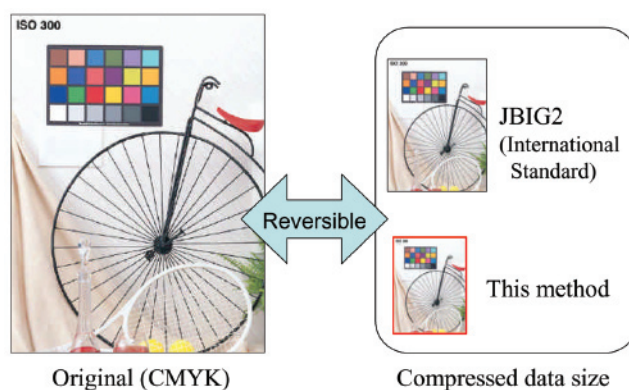
The bi-level image compression method developed by AIST was adopted into the international standard JBIG2 as "ISO/IEC 14492 AMD2." AIST method achieved a compression efficiency that was about 23% better than JBIG2, owing to optimizing the parameters by the genetic algorithm.

The spread of the international standards accepted here will not only promote the cost reduction based on digital printing and publication, but also substantially contribute to the development of digital printing machine industry, to accelerate the expansion of markets for new generation publications, such as on-demand publishing and eBook.

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AIST Today Vol. 3, No.10 (2003) 7-9

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Lossless bi-level image compression method, whose compression efficiency is more than 20% higher (or, in some cases, more than 30% higher) than that of the current international standards, JBIG2