[A2] Invention Encouragement Award,
Awarding and Exhibitions | Japan Institute of Invention and Innovation

- **Awarding Organization**:
  Japan Institute of Invention and Innovation (JIII)
- **Recipient(s)**:
  Ichiro Shibasaki, Senior Researcher, R&D Group, General Technology Research Institute, Asahi Chemical Industry Co., Ltd.
  Kohei Nonaka, Chairman, Asahi Kasei Electronics Co., Ltd.
  Tsuyoshi Shimizu, Deputy Director, Shiga Plant, Asahi Kasei Jyuko Co., Ltd.
- **Citation**:
  Commendation for Patented Technology for Fabrication of High-Sensitivity InSb Thin-Film Hall Element of HW Series
- **Purpose**:
  Established in 1921, the Regional Commendation for Invention aims to promote local industry and encourage technological innovation across Japan's regions [1].
- **Value of the Award**:
  - Public recognition of inventors' creativity and achievements
  - Enhancement of corporate reputation and technological credibility
  - Promotion of intellectual property utilization
  - Encouragement for future innovation and development

Article Summary

December 1992 – Company Bulletin “Asahi”

Mr. Shibasaki, Mr. Nonaka, and Mr. Shimizu received the Invention Encouragement Award for establishing a unique mass production method for Hall elements.

平成4年度

地方発明賞に2件5人が受賞

このほど、平成四年度地方発明賞が決定し、当社からも富士と延岡で表彰を受けた。この表彰制度は、社団法人発明協会が主催し各地方における発明の奨励・育成を図ると共に、科学技術の向上と地域産業の振興に寄与することを目的としている。今年受賞したのは次の方々。

関東地方

発明奨励賞 「ホール素子の製造方法」の発明

技術総合研究所 基礎研究所 (BSIグループ) 参事 **柴崎一郎**さん

旭化成電子㈱ 会長 **野中康平**さん

旭化成住工㈱ 滋賀工場次長 **清水　剛**さん

ホール素子は、半導体のホール効果により素子に加えられた磁界の磁束密度（磁場の強さと性質を表わす量）に比例した電圧信号、すなわちホール出力電圧を取り出すように構成された素子である。当初、ホール素子は単結晶をスライスおよび研磨し、厚さ五～二十μm程度としたものに電極を付けたものが出回っているのみで、性能は不安定でかつ単価も高かったため計測用などの特殊な用途でしか使われなかった。

本発明は、薄いマイカ（雲母）を基板に用い、真空蒸着法により、それまでは不可能であった一・〇μm以下で高い電子移動度と高いシート抵抗を持つインジウムアンチモン（InSb）薄膜を工業的に量産する独自技術を開発したもの。この結果①生産性が高く製造コストを大幅に下げ、大量供給できる技術が確立したこと、②従来できなかった高感度ホール素子を製作できる、③従来の常識（ホール出力電圧の温度変化が大きく使いにくい）を破る温度特性の大幅な改善を達成した、等々の効果を実現した。

この製法によるホール素子の出現によってホールモーターへの応用開発が急速に拡大し、現在市場でホールモーター用の磁気センサーとして大量に使われている。たとえば、プレーヤーのダイレクトドライブ用ホールモーターに採用されプレーヤー性能の改善に成功した、あるいは、VTRのホールモーターに使われモーターの制御性の向上・小型化・低ノイズ化によりVTRの大幅な性能向上をもたらした、などはすべて本発明の技術により初めて可能になったものである。

Two Inventions by Five Individuals Receive Regional Invention Awards

Recently, the recipients of the FY1992 Regional Invention Awards were announced, and five individuals from our company, located in Fuji and Nobeoka, were honored.

These awards aim to contribute to the advancement of science and technology and the promotion of regional industries.

Organized by the Japan Institute of Invention and Innovation, the award system encourages and fosters inventions in various regions.

This year's award recipients from our company are:

- Ichiro Shibasaki, Senior Researcher, R&D Group, General Technology Research Institute
- Kohei Nonaka, Chairman, Asahi Kasei Electronics Co., Ltd.
- Tsuyoshi Shimizu, Deputy Director, Shiga Plant, Asahi Kasei Jyuko Co., Ltd.

Kanto Region Invention Encouragement Award – Invention of "Method for Manufacturing Hall Elements"

A Hall element is a device designed to extract a voltage signal—known as the Hall output voltage—that is proportional to the magnetic flux density (a quantity representing the strength and nature of a magnetic field) applied to the element, based on the Hall effect in semiconductors. Initially, Hall elements were made by slicing and polishing single crystals to a thickness of about 5 to 20 μm, attaching electrodes, and distributing them. However, due to their unstable performance and high unit cost, they were only used for specialized applications such as measurement.

This invention utilizes thin mica sheets as substrates and employs a vacuum deposition method to develop a proprietary technique for industrially mass-producing indium antimonide (InSb) thin films with high electron mobility and high sheet resistance at thicknesses below 1.0 μm—something previously considered impossible. As a result, the invention achieved the following:

1. Established a technology that enables high productivity and significantly reduced manufacturing costs, allowing for large-scale supply.
2. Enabled the production of highly sensitive Hall elements that were previously unattainable.
3. Achieved a dramatic improvement in temperature characteristics, overturning the conventional belief that Hall output voltage varies significantly with temperature and is therefore difficult to use.

The emergence of Hall elements produced by this method has rapidly expanded their application in Hall motors, and they are now widely used as magnetic sensors in the market.

For example, they have been adopted in direct-drive Hall motors for record players, successfully improving player performance. They have also been used in Hall motors for VTRs, contributing to significant performance improvements through enhanced motor controllability, miniaturization, and noise reduction. These advancements were all made possible by the technology of this invention.