Development of new rolling technology for commercial magnesium alloy sheet

Start of sample shipments for wide-width commercial magnesium alloy sheet with high room temperature formability

It is known that room-temperature formability of a magnesium alloy sheet is much lower than those of steel and aluminum alloy sheets. Thus, in the conventional press-forming process of a magnesium alloy sheet, a sheet and dies must be heated at above 250 °C. In the newly developed rolling process, a commercial magnesium alloy sheet is rolled at a temperature about 100 °C higher than that in the conventional rolling process. The magnesium alloy sheet processed by the new rolling process exhibits a significantly weak crystal orientation, resulting in the excellent room-temperature formability comparable to those of aluminum alloy sheets. This means that a conventional press-forming machine without heating equipment is available, and significant cost reduction and enhanced productivity are expected. In addition, since composition of the new magnesium alloy sheet is the same as those of commercial magnesium alloy sheets, conventional surface treatment processes are directly applicable.

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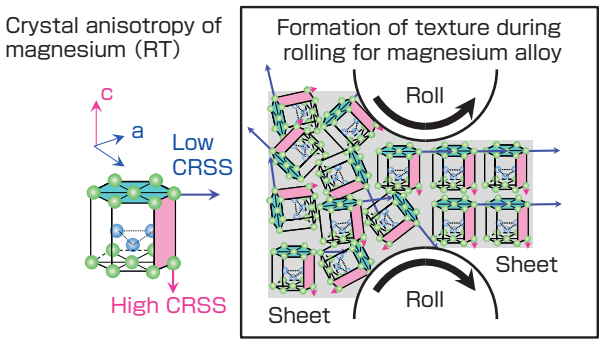

Crystal anisotropy of magnesium at room temperature (left), Formation of texture during rolling (right)

CRSS: Critical resolved sheat stress

Simple method for high-purity separation of metallic and semiconducting carbon nanotubes

An automated, continuous, and repeatable process would realize cost-efficient separation

We have developed a novel method to separate metallic and semiconducting single-wall carbon nanotubes (SWCNTs) with high purities using agarose gel column chromatography. The synthesis of SWCNTs usually yields a 1:2 mixture of metallic and semiconducting SWCNTs. Although these two types of SWCNTs must be separated for their application in electronic devices, this separation could not be achieved easily. The developed method uses a column filled with agarose gel beads, in which the semiconducting SWCNTs are selectively adsorbed and then eluted. The column can be used repeatedly, and the separation process can be easily automated. Purities of separation were 95 and 90 % for semiconducting and metallic SWCNTs, respectively. Because this continuous, repeatable separation method is applicable to a low-cost, large-scale process, it should enable the industrial production of metallic and semiconducting SWCNTs.

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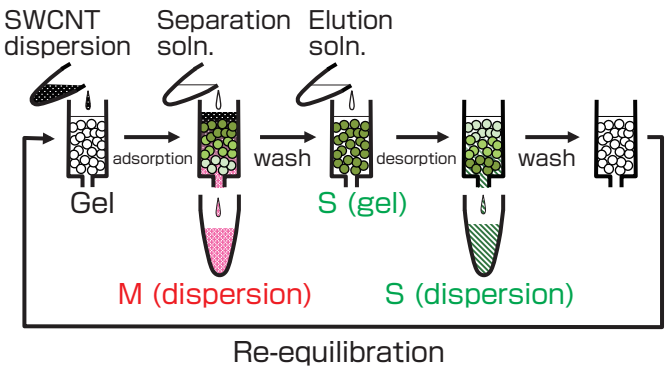

Schematic diagram of metal/semiconductor separation of SWCNTs using a column