



## MAX-PLANCK-INSTITUT FÜR EISENFORSCHUNG

### Press Release

2. August 2011

#### **New high-performance steel with potential applications in the automotive industry**

Scientists at the Max-Planck-Institut für Eisenforschung succeeded in creating a new high-performance steel which meets requirements for high strength and ductility. Further research is being done to decrease the production costs and to improve the mechanical properties. The ultrahigh strength steels contain almost no carbon, but 15-20% nickel. Additional alloy components generate extremely high strength by forming intermetallic precipitations.

“The use of a higher amount of nickel resulted in stronger steel, but also caused a more expensive production. Fortunately, we found a solution for this aspect too”, says Dr. Dirk Ponge, one of the research group leaders at the MPIE. The solution lies in the reduction of the manganese content, which causes an increase in strength, ductility and a TRIP (*transformation induced plasticity*) effect during heat treatment. This effect leads again to an increase in strength AND ductility. At the same time this so called ‘lean maraging TRIP steels’ can be elongated by 15-20 %.

“The high strength allows for a weight reduction and the high ductility permits the production of complicated construction parts plus increases the safety. Besides that, the costs can be reduced by limiting the nickel content. Another advantage is the low energy consumption”, says Dr. Ponge.

Currently, optimization is going on with the means of computational materials design.

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At the Max-Planck Institut für Eisenforschung GmbH (MPIE), research is carried out on iron, steel and related materials. An essential target of the investigations is an improved understanding of the complex physical processes and chemical reactions of these materials. In addition, new high-performance materials with outstanding physical and mechanical properties are developed for use as high-tech structural and functional components. In this way, basic research is amalgamated with innovative developments relevant to applications and process technology. The MPIE is financed in equal proportions by the Max-Planck Society for the Advancement of Science and the Steel Institute VDEh.

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