

Recent results and trends in heat treatment and surface engineering

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Since centuries heat treatment of metals is done to set the needed properties for the use of tools, utility goods, and machine parts. Up to the middle of the 19th century heat treatment had been a kind of secret science and a series of myths of different nations describes the manufacturing of fabulous swords which got their properties by secret heat treatment procedures. Then in the 19th century scientist like Martens started to explain academically metallurgical phenomena. Since this time heat treatment started to be a scientific discipline.

By the better understanding of the physical processes, the possibility of the evolution of existing processes increased and the foundation for the development of new heat treatment processes was laid.

The talk deals with the situation today with the focus on particular fields of heat treatment technologies, like quenching technologies, nitriding, nitrocarburizing, carburizing, and carbonitriding as important thermo-chemical heat treatment processes, sensors in heat treatment, development of materials in respect of their behavior and performance during and after the heat treatment. Developments on the field of nitriding and carbonitriding will be the main focus of the reflections. Especially the combination of sensor technologies and thermo-chemical processes are promising options.