NEW AREAS OF RESEARCH IN CHEMICAL METALLURGY:
SALT-METAL EQUILIBRIA IN REMELTING OF MAGNESIUM ALLOYS

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Magnesium alloys are increasingly used, because of their low weight, in the automotive industry for making certain parts. Unfortunately, primary magnesium is very expensive due to the high energy consumption in the electrolytic production process. Therefore, magnesium based alloys must be recycled to make their application economical. The important step in the recycling schemes is the melting in the presence of salt mixtures. Chemical reactions may occur between the salt and metal melts which have to be known for maintaining the metallurgical control of the process. We investigated the salt-metal equilibria between magnesium-lithium alloys and salt mixtures consisting of potassium chloride and lithium chloride as base components and magnesium chloride, calcium chloride and barium chloride as additional components. The salt/metal samples were melted in iron crucibles, then kept for several hours at 750 °C to attain equilibrium, and quenched. The metal and salt phases were carefully separated from each other and their compositions were determined by chemical analysis. The following reactions were studied: reaction of magnesium chloride with lithium, reaction of calcium chloride with lithium that leads to a pick up of calcium of the metal phase, reaction of barium chloride with lithium that causes pick up of barium of the metal phase. The obtained equilibrium data are given and are compared with thermodynamic predictions. Also, the iron contents of the metal melt in equilibrium with solid iron (iron crucible) were determined which decrease strongly with increasing lithium content.