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Bulk Solid State Chemistry of Getter Alloys: Correlation to Heterogeneous Catalysis

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1. Introduction

The gettering process requires beside chemisorption and activation of gas molecules also the stable binding of the sorbate. If this would occur only at the surface of the getter its capacity would be used very poorly. Hence there have to be also mechanisms by which the surface-Activated species are transported below the surface and stored there without disintegrating the solid getter. The requirement of the transport process sets limits to the reactivity of a getter such that activates molecules without, however, forming too strong surface chemical bonds which would prevent the transport sub-surface into the active material.

Much in this scenario is reminiscent to the design problems of heterogeneous catalysts. Although, in these

reactions the recombination of sorbed species to desired and undesired products will occur, it is inevitable that the process of subduction of species under the surface operates in competition to the surface processes.

The incorporation of extra atoms has consequences for the electronic structure and hence for the chemisorptive properties of a catalytic and gettering surface. This will affect the properties of a substance for activating molecules in a subtle way.

An example will shown how this interrelation between surface reaction and solid state chemistry affects the overall reactivity. In the specific case of a getter, a Laves phase alloy material will be investigated for its structural details and the sorption properties.