

Technology Offer

CSIC/CV/010

## Nickel as a High-Efficiency Catalyst in the Deuteration of Silanes and Boranes



**Highly efficient nickel catalyst for the deuteration of silanes and boranes, offering high conversions, mild reaction conditions, and broad versatility, covering primary, secondary, and tertiary silanes, as well as various types of boranes.**

### Intellectual Property

Priority patent application filed

### Stage of development

Laboratory-scale optimized technology

### Intended Collaboration

Licensing and/or co-development

### Contact

Cristina Villodres Ruiz  
 Vice-presidency for Innovation and Transfer  
[cristina.villodres@csic.es](mailto:cristina.villodres@csic.es)  
[comercializacion@csic.es](mailto:comercializacion@csic.es)



### Market need

Deuterated silanes are valuable reagents for incorporating deuterium atoms into organic molecules, and those deuterium-labeled compounds play a crucial role in chemical research, as well as in the food and pharmaceutical industries. However, the synthetic methods used to produce these compounds face environmental challenges, primarily due to the significant waste generated by stoichiometric reactions involving chlorosilanes and metal deuterides such as  $\text{NaBD}_4$  or  $\text{LiAlD}_4$ .



### Proposed solution

The design of efficient metal catalysts that minimize the generation of harmful or hazardous by-products is seen as an ideal solution to this problem. Among the various alternatives offered by this strategy, our catalyst not only enables the reaction to be carried out with high efficiency but also provides a significant economic advantage, as it is based on an abundant and cost-effective metal like nickel and is effective at room temperature, with low catalytic loading.

### Competitive advantages

- Active catalyst with a broad range of tertiary, secondary and primary silanes.
- Conversions greater than 95% in most cases.
- Process carried out at room temperature with low deuterium pressures.
- Shorter reaction times compared to other similar catalysts.