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First principles analysis of Hedvall's magnetocatalytic effect in subnanometre base metal clusters DANIEL TORRES, JEFFREY GREELEY, Argonne National Laboratory — Magnetic order is destroyed in a ferromagnetic material warmed above its Curie temperature. This loss of order leads to a number of old-known phenomena, such as the Hedvall's magnetocatalytic effect: an abrupt change in the rate of a chemical reaction on a magnetic surface at the Curie point. Here, we present a relationship between catalytic activity and magnetic properties of the catalyst. Using the methanation reaction as the example, we suggest that the magnetic transition of small base metals clusters significantly affects catalytic activity. These results provide an unambiguous case of Hedvall's magnetocatalytic effect produced by soft ferromagnets.

Daniel Torres
Argonne National Laboratory

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