

# A Chemical View of the New Superconductors MgB<sub>2</sub> and MgCNi<sub>3</sub> And a Question for Theorists about Electronic Structure

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The surprising discovery of superconductivity at 39K in MgB<sub>2</sub> has stimulated a great deal of research into its superconducting properties. Unfortunately, the prospects for growth of single crystals remain very remote (I'll explain why), which will limit the degree of detailed characterization possible. Many chemical doping studies have been published and posted on the LANL physics preprint server. Such studies can often be very helpful in elucidating the fundamental character of the superconductivity in interesting materials, but unfortunately in the case of MgB<sub>2</sub> almost all such reports are unreliable. I will describe the characteristics displayed by reliable and unreliable chemical studies. Our work on the intermetallic perovskite superconductor MgCNi<sub>3</sub> will also be described, as will its relationship to the lanthanide nickel borocarbide superconductors. Finally, I will end with a question about electronic structures which has arisen in our work on Co and Ru based oxides.