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Protected Noble-Metal Clusters at the Transition from Molecules to Materials

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Protected noble-metal clusters are found at a molecular level of definite composition and structure up to a size of 145-165 metal atoms. Curiously, this size-range is also where several key signatures of metallic character begin to converge. These substances have been of great interest for many application-areas in the past couple decades, but the understanding of their structure and bonding, remarkable self-selection, electronic structure and optical properties has only recently started to reach a fundamental or molecular level of definition. This presentation emphasizes this recent progress and also outlines the prospects for extending the molecular domain of metallurgy well beyond the 200- atom range, thanks to advances in experimental & theoretical methods.