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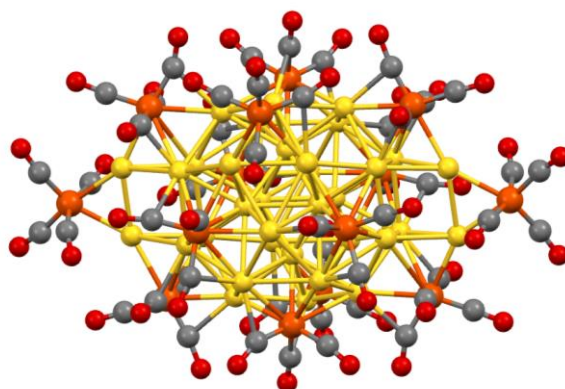
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## Single crystal analysis of nanosized carbonyl clusters

The chemistry of transition metal carbonyl clusters (TMCCs) started many decades ago, more specifically on 1905-1907, with the discovery of  $\text{Fe}_2(\text{CO})_9$  [1] and  $\text{Fe}_3(\text{CO})_{12}$  [2] neutral species by J. Dewar and H. Jones, then continued in the thirties with W. Hieber. [3] However, *it was with the development of single-crystal X-ray diffraction techniques that this chemistry really took off*, mainly thank to Prof. L. Dahl. [4] In fact, the spectroscopic techniques commonly employed in other fields of research are not suitable to unambiguously identify the nature of TMCCs. More available structural data meant the possibility of rationalize and develop synthetic routes for new metal carbonyl clusters. One of the biggest pioneer in this field has been P. Chini, who synthesized several new species until 1980. [5]

The role of single-crystal X-ray diffraction techniques is crucial in this chemistry. TMCCs present absorption problems and low diffraction power, therefore they need X-ray sources of high intensity and more and more sensitive detectors. With the new CCD and, more recently, CMOS area detectors one can successfully collect enough data (in one-two days) to characterize high nuclearity TMCCs even with dimensions that enter the nanosized regime.



Molecular structure of  $[\text{Au}_{34}\{\text{Fe}(\text{CO})_3\}_6\{\text{Fe}(\text{CO})_4\}_8]^{8-6}$

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