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Superconductivity in the Intercalated Graphite Compounds C_6Yb and C_6Ca

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Low dimensionality is generally considered as a necessary ingredient for high superconducting transition temperatures. Surprisingly, perhaps, systems based on graphite have received little attention in this context. Introducing metal atoms between the carbon layers can tune the interlayer spacing and charging of the graphite host through a variety of electronic ground states. One such ground state is superconductivity, which is not present in pure graphite. Our discovery of superconductivity in the intercalation compounds C_6Yb and C_6Ca , with transition temperatures of 6.5 and 11.5 K, respectively has reignited the debate on such systems. These critical temperatures are unprecedented in graphitic systems and have not been explained by simple mechanisms for the superconductivity. This discovery has already stimulated several proposals ranging from exotic superconducting mechanism to new structural phases. We will present an overview with particular emphasis on recent results from high-pressure experiments.