

Abstract Submitted  
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**High pressure-High temperature phases of Carbon Dioxide**  
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phase diagram of CO<sub>2</sub> has not been understood adequately above 40 GPa and high  
temperatures, particularly regarding the stabilities and boundaries of various extended  
phases that include a-carbonia, Phase V, Phase VI, and to an extent Phase  
III. We have studied the phase diagram of CO<sub>2</sub> above 40 GPa and at high temperatures,  
using both ohmically and laser-heated diamond anvil cells. We found the co-existence  
of several extended phases over a large pressure region, which we attribute to the  
metastability of the extended phases and the extraordinarily large pressure gradients  
at these pressures. We determined the relative stability fields of the co-existing  
phases, which may offer the physico-chemical mechanism for the existence of carbonate  
minerals in deep Earth's mantle.

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