Diamond genesis is an intriguing issue for diamond resources and Earth Carbon Cycle. Besides kimberlitic diamonds, many characteristic ultradeep diamonds hosting inclusions with phase assemblages with a sublithospheric origin have been exploited throughout the world. Ultradeep diamonds with their chemical and inclusion compositions not only record a history of oceanic lithosphere subduction and upward transport at a depth of >250 km to 660 km or deeper, but also indicate their genesis pertinent to mantle-carbonatite melts in a Fe$^0$-buffered reduced condition. In our pilot experiment, the formation of diamonds from MgCO$_3$-Fe$^0$ system was evidenced in a diamond anvil cell device at ~25 GPa and ~1800 K, the conditions of the depth of ~660 km in the mantle. A detailed study of redox mechanism of MgCO$_3$-Fe$^0$ coupling has been conducted using large volume press along the oceanic lithosphere subduction paths in the pressure-temperature range of 6-25 GPa and 1200-2000 K, covering the formation region of most ultradeep diamonds. The clear reaction boundaries around Fe$^0$-foil in contact with MgCO$_3$ strongly support the redox reaction between carbonatitic slab and Fe$^0$-bearing metals under mantle conditions. Our study experimentally documents the possibility of ultradeep diamond genesis at Redox conditions of carbonateic slab and Fe$^0$-bearing metals. Furthermore, we will discuss the rates of diamond formation as a function of pressure-temperature conditions.