In situ analysis of inclusions in diamonds from collections

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Diamonds represent one of the few witnesses of our planet interior. They are mainly formed in the first 200 km of the lithospheric mantle, and, more rarely from the transition zone to 700 km deep. Diamonds contain a lot of information about global evolution, however their mode of formation remains poorly understood. Recent studies in high-pressure mineralogy suggest that diamonds precipitate from oxidized metasomatic fluids. The study of inclusions trapped in diamonds may provide precise information on composition, pressure, temperature and redox conditions. The aim of this study is to use the inclusions trapped in diamond as probes of the deep cycling of volatiles (C, H, halogens). Therefore, we investigate inclusions in diamonds with a systematic study of diamonds from collections. We selected 73 diamonds from three museums: National Museum of Natural History, School of Mines and Sorbonne University. The selected diamonds are studied with the help of a large range of *in situ* methods: RAMAN and FTIR spectrometry and X-Ray Diffraction. These analyses allow us to identify the nature of the different inclusions without damaging the gems. First results indicate silicate minerals inclusions as pyrope garnet, olivine and enstatite pyroxene. This assemblage is typical of peridotitic-type diamonds in the lithosphere.