SHOCKED CALCITE - DYNAMIC COMPRESSION, AND ADIABATIC DECOMPRESSION EXPERIMENTS, MODELING, AND OBSERVATIONS IN NATURE

1Deutsch, A., 2Langenhorst, F., 3Ivanov, B.A., 4Horneman, U. 1D-48149 Univ. Münster,2BGI D-95440 Bayreuth, 3Russ. Acad. Sci. Moscow, EMI D-79588 Efringen-Kirchen

Impact-induced CO2 release from CaCO3 may have significantly contributed to the K/T mass extinction as the Chicxulub bolide impacted an anhydrite-rich carbonate platform. Quantification of the suddenly released CO2 is ham-pered by (i) contrasting results of various shock experiments, and thermodynamical modeling, and (ii) lack of clear criteria to identify shocked carbon-ates at terrestrial impact sites. In order to better constrain shock metamorphism of calcite, we simulate dynamic compression (high-explosive experiments, up to 100 GPa), and fast unloading (multi-anvil apparatus, quenching to am-bient pT from 25 GPa at 2400° C in 3 sec), and we construct an updated EOS for cal-cite to analyze the experimental data and to simulate numerically the experiments. Amongst other effects, we have ob-served textures indicative for melting and degassing, as well as seemingly recondensed calcite in a 73 GPa experiment using a newly designed sample container. The microstructures of the recovered material are investigated with FE-SEM, X ray, RAMAN, and ATEM techniques, including EELS. At a first glance, we conclude from our data that the quantity of CO3 release in impact processes is often overestimated.