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Fast Scanning Calorimetry studies of glassy and supercooled water¹ DEEPANJAN BHATTACHARYA, The George Washington University, CANDACE PAYNE, The University of Aberdeen, VLAD SADTCHENKO, The George Washington University — Despite intense efforts, development of a comprehensive system of relationships between various condensed phases of water remains an illusive goal. The lack of consensus on the nature of supercooled and glassy water is due primarily to the lack of kinetic and thermodynamic data at temperatures from 150 to 235 K. Because supercooled water undergoes rapid crystallization near 235 K, application of standard experimental methods is virtually impossible. With the objective of gaining insights into properties of water, we have developed an experimental approach which relies on rapid (1000000 K/s) heating of micro- and mesoscopic aqueous samples prepared by vapor deposition in vacuum at cryogenic temperatures. Due to high heating rates, this Fast Scanning Calorimetry approach, makes it possible to bypass crystallization and to obtain new data on molecular kinetics and thermodynamics in glassy water in previously inaccessible temperature interval. We will report the results of our FSC studies and discuss their impact on fundamental and applied research areas where glassy and supercooled water plays significant role.

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