

The Water D/H Ratio in Molecular Outflows in Orion BN/KL

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We present an examination of the shocked water formation in Orion BN/KL, by a theoretical constraint of the deuterium fractionation of water with observations. The search of the origin of water in dense molecular clouds, where stars are forming, is crucial as it may trace the origin of the cometary ices and even the terrestrial water. In this study, we mainly focus on investigating the HDO/H₂O ratio in the outflowing gas (the plateau), which has shown enhanced water abundance in previous observations. Two scenarios have been suggested to form water in outflows— the shocked water in outflows is produced via high-temperature shock chemistry and/or grain surface evaporation. We present here the results from a chemical model for the water production in shocks, and show how the HDO/H₂O ratio can be used to constrain the origin of the observed water.