

Spectroscopic Observation of Atomic Li and Na Cations in Clathrate Hydrates Phase

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Atomic Li⁺ and Na⁺ cations entrapped in small cages of LiSO₃CF₃ + D₂O + C₂H₆ and NaSO₃CF₃ + D₂O + C₂H₆ hydrate systems were observed. In the results of ⁷Li, ²³Na, and ¹³C NMR study, unique peaks were observed in the case of each type of nucleus, except in the hexagonal ice phase. While small lithium and sodium cations seem to be unfavorable for capture in hydrate cages, they might favorably migrate through pentagonal or hexagonal faces of cages. Also, these cations are not captured by common van der Waals interaction due to their size, but are stabilized via ionic interaction with pre-captured triflate anions.