

## A RIGOROUS K/Ka-BAND HUNT FOR AROMATIC MOLECULES (ARKHAM): UBIQUITOUS AROMATIC CARBON CHEMISTRY AT THE EARLIEST STAGES OF STAR FORMATION

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Benzonitrile ( $C_6H_5CN$ ), a polar proxy for benzene ( $C_6H_6$ ), has the potential to serve as a highly convenient radio probe for aromatic chemistry, provided this ring can be found in other astronomical sources beyond the molecule-rich prestellar cloud TMC-1 where it was first reported by McGuire et al. (2018). Here we present radio astronomical evidence of benzonitrile in four additional pre-stellar, and possibly protostellar, sources: Serpens 1A, Serpens 1B, Serpens 2, and MC27/L1521F. These detections establish benzonitrile is not unique to TMC-1; rather aromatic chemistry appears to be widespread throughout the earliest stages of star formation, likely persisting at least to the initial formation of a protostar. The abundance of benzonitrile far exceeds predictions from models which well reproduce the abundances of carbon chains, such as  $HC_7N$ , a cyanopolyynes with the same heavy atoms, indicating the chemistry responsible for planar carbon structures (as opposed to linear ones) in primordial sources is favorable but not well understood. The abundance of benzonitrile relative to carbon-chain molecules displays sizable variations between sources within the Taurus and Serpens clouds, implying the importance of physical conditions and initial elemental reservoirs of the clouds themselves.