The complexity of carbonaceous molecules, their abundance and timescale of formation in our evolving universe are crucial questions within cosmic chemistry. Astronomical observations confirm that organic chemistry in space seems to follow common pathways throughout space. All three iso-forms of carbon: diamond, graphite and fullerene, have been identified in space environment. Aromatic material, in the form of gaseous polycyclic aromatic hydrocarbon as well as solid aromatic structures, comprises most of the carbon in the interstellar medium, comets and meteorites and was also likely the most abundant material delivered to the young planets. The hostile environmental conditions on the young Earth, including extreme temperatures and radiation, may have led to protocells self-assembled from components different from those used in modern biochemistry. We propose that assemblies based on aromatic hydrocarbons may have been the most abundant flexible and stable organic materials on the primitive Earth and discuss their possible integration into a minimal life form. We have elaborated how aromatic molecules might function as container elements, energy transduction elements, and templating genetic components. We discuss how a variety of transitions from nonliving to living matter could be experimentally tested. This paper presents an interdisciplinary approach to interface state of the art knowledge in astrochemistry, prebiotic chemistry, and artificial life research.