Phase 1:

Impact vaporizes the ocean. H₂ is generated by reactions between the atmosphere and impactor iron, and melted crust.

Asteroid with

iron core

Earth

Phase 2:

As steam cools, equilibration between H₂, N₂ and CO₂ makes CH₄ and NH₃. Steam eventually condenses to an ocean.

Phase 3:

N₂ and CH₄ photochemistry generates HCN and other prebiotic nitriles.
H₂ escapes to space.

