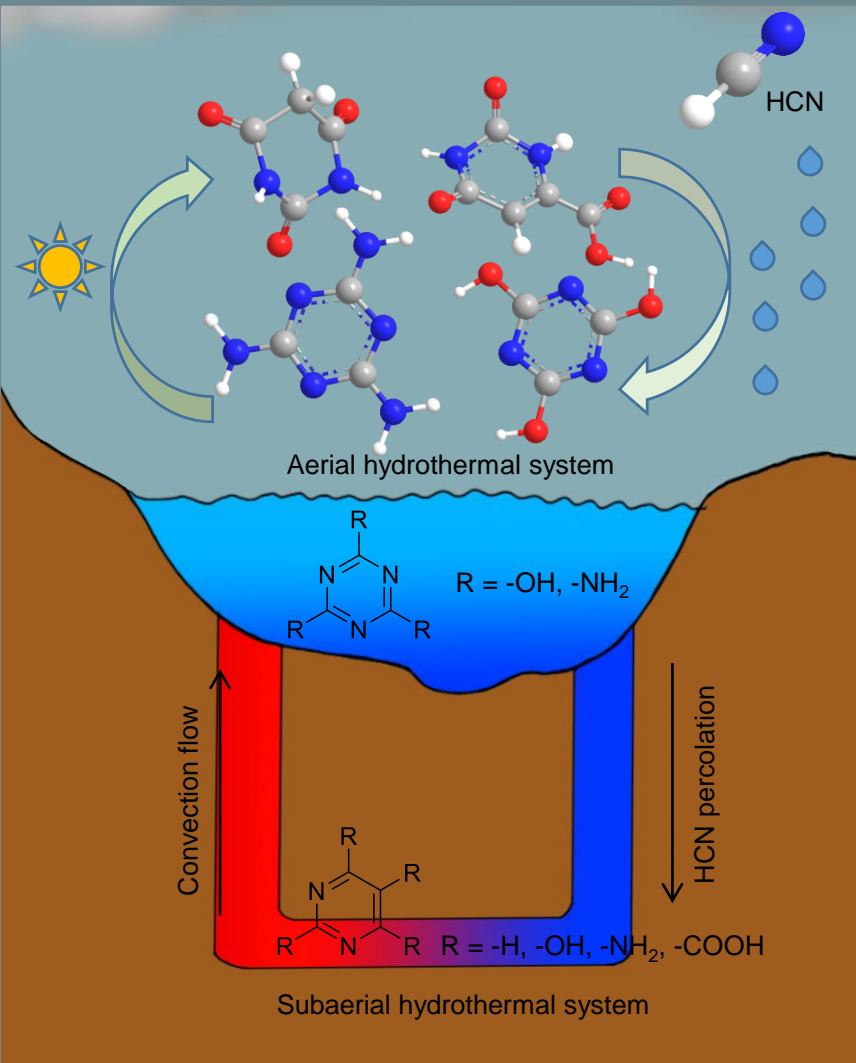


# Prebiotic synthesis of noncanonical nucleobases under plausible alkaline hydrothermal conditions



Herein, the potential of alkaline hydrothermal environments for the synthesis of possible ancestral pre-RNA nucleobases using cyanide as a primary source of carbon and nitrogen is described. Water cyanide polymerizations were assisted by microwave radiation to obtain high temperature and a relatively high pressure (MWR, 180 °C, 15 bar) and were also carried out using a conventional thermal system (CTS, 80 °C, 1 bar) to simulate subaerial and aerial hydrothermal conditions, respectively, on the early Earth. For these syntheses, the initial concentration of cyanide and the diffusion effects were studied. In addition, it is well known that hydrolysis conditions are directly related to the amount and diversity of organic molecules released from cyanide polymers. Thus, as a first step, we studied the effect of several hydrolysis procedures, generally used in prebiotic chemistry, on some of the potential pre-RNA nucleobases of interest, together with some of their isomers and/or deamination products, also presumably formed in these complex reactions. The results show that the alkaline hydrothermal scenarios with a relatively constant pH are good geological scenarios for the generation of noncanonical nucleobases using cyanide as a prebiotic precursor.