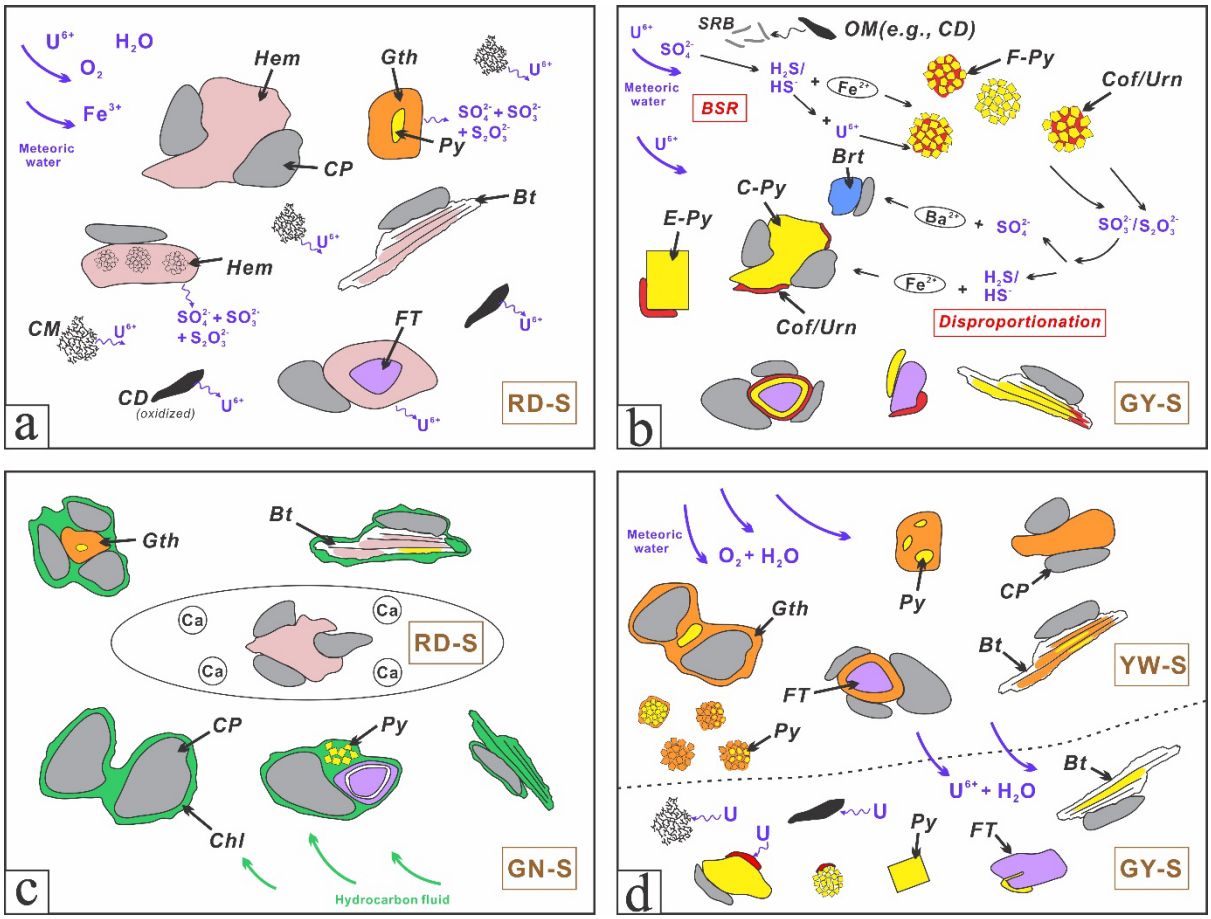
In the Dongsheng U deposit, infiltration of oxygenated groundwater in reduced sandstones led to the oxidation of pyrite into hematite, and the leaching of U trapped by Fe-Ti oxides, carbonaceous debris and clay minerals in red sandstones. Sulfate ions from pyrite oxidation were used to produce ore-stage framboidal pyrite by biogenic process (bacterial sulfate reduction), and the sulfite and thiosulfate ions produced from dissolution of framboidal pyrite were used through Ostwald ripening to produce euhedral and cement around the residual framboids in grey sandstones. Additionally, U-bearing minerals (coffinite and uraninite) were produced by reducing media (H_2S/FeS_2) and distributed around pyrite and Fe-Ti oxides. Infiltration of hydrocarbons in the red sandstones led to the reduction of hematite into chlorite, thus changing red sandstones into green sandstones, preventing U ore from oxidation. Once the sandstone was exposed at the surface, pyrite and U-bearing minerals in grey sandstones were oxidized and weathered by meteoric water, goethite was produced and gave the sandstones yellow color, and the dissolved U was re-adsorbed on carbonaceous debris and coal seams nearby.



GN-S = green sandstone, GY-S = gray sandstone, RD-S = red sandstone, YW-S = yellow sandstone, Brt =

barite, BSR = bacterial sulfate reduction, Bt = biotite, Ca = calcareous concretion, CD = carbonaceous debris, Chl = chlorite, CM = clay minerals, Cof = coffinite, CP = clastic particle, FT = Fe-Ti oxides, Gth = goethite, Hem = hematite, OM = organic matter, Py = pyrite, C-Py = cement pyrite, E-Py = euhedral pyrite, F-Py = framboidal pyrite, SRB = sulfate-reducing bacteria, Urn = uraninite.