Investigating phosphorites organic matter and trace elements contents to reconstruct phosphogenesis conditions and to identify processes improving phosphoric acid production

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The phosphorites depositions in Israel are part of a phosphorites belt that stretches from Turkey to Morocco and formed during mid-Cretaceous to Eocene periods. Phosphorites with high total organic content (TOC) are dominant by kerogen, While, phosphorites with low organic content (< 1%) consist of significant part of Humic Substances (HS). Two main phosphorite facies existed in synclines, pristine phosphorite that are the primary phosphogenesis sites, and reworked phosphorites created by winnowing and sieving of pristine phosphorites. This study investigated the chemistry and organic substances distribution in pristine and reworked phosphorites sections from two synclines Zin and Rotem (Southern Israel) in order to improve our understanding of organic substances and metals preservation in sediments. The distribution of organic substances is similar in both reworked and pristine phosphorites layers from each site. High concentrations of Mo, Cd, Zn, Cu and Ni in pristine phosphorites may serve as an indicator on prevailing sulfidic conditions. Low concentrations of Mo, Cu and Ni obtained in reworked phosphorite are likely resulted from sieving and oxidizing processes. It seems HS accumulation in phosphorites is mostly influenced by redox condition and not by organic accumulation rates. The good correlation between HS and Cu content in both pristine and reworked phosphorites was found and probably can serve as a marker for the presence of HS in phosphorites. Good correlation between Mo and TOC contents in the pristine phosphorites in Rotem syncline but not in Zin syncline suggests prevalence of more sulfidic condition at Rotem supported by low content of kerogen in Zin sites (10-20%) compare to Rotem (40%-60%).