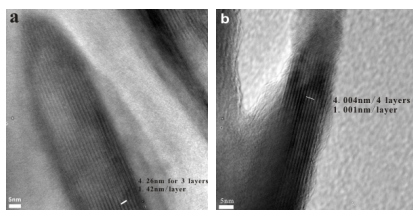


## Authigenic minerals and their formation environment in surface sediments of modern salt lakes in the Hoh Xil area, China

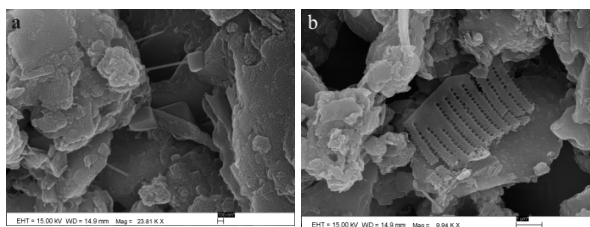
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Authigenic minerals in surface sediments in modern salt lakes of the Hoh Xil area, China were studied by XRD, XRF, SEM and TEM. The results show in alkaline and reducing conditions of the lakes (pH from 8.3 to 9.63, Eh from -143 to -70), the formation of authigenic clays was influenced by salinity and alkalinity, and the critical values are 15g/l and 30mmol/l, respectively. The quantity of authigenic clays is relative small, and they occur as aggregates of fine fibrous crystals, which are different from the more abundant detrital clays with relatively large particles and irregular shape, as observed by TEM. Chemical composition and the lattice images of the fibrous crystals confirm that the mineral phases are chlorite and illite (Fig.1a, 1b). Furthermore, a small amount of authigenic calcite appear in approximately cubic shape (Fig.2a) with the chemical compositions of Ca, O and C by SEM and EDS. The existence of calcite is consistent with alkaline water environment of the lakes. Also, there are some diatoms (Fig.2b) and mycelium around the calcite and clay minerals, indicating the formation of authigenic minerals also be related to bacterial action.



**Fig. 1** Lattice images of authigenic clay minerals



**Fig. 2** Authigenic calcite, bacterial secretions (a) and diatoms (b)