

Contamination of surface water or groundwater by metals and/or metalloids, originating from landfill leachates is environmental concern in the vicinity of landfills designed for disposal for municipal solid waste (MSW). It is known that many organic compounds and metals/metalloids can be associated with colloids of the size 1 nm-1  $\mu$ m. This relationship is mainly caused by the total surface area of colloids and consequently their binding capacity for contaminants occurring in the aqueous environment. In order to identify these associations in landfill leachates a cascade frontal filtration/ultra filtration is often adopted.

Colloids obtained by this size-fractionation can be further studied by scanning electron microscope (SEM) or transmission electron microscope (TEM) coupled to energy dispersive spectroscopy (EDS).

Typical example is a Vejen landfill in Denmark, which has been extensively studied, where leachate samples exhibited significant proportion of total metal content to be associated to colloids - Cd: 38-45%, Ni: 27-56%, Zn: 24-45%, Cu: 86-95% and Pb: 96-99%. Whereas Cd, Zn and Ni were mostly associated with smaller colloids (1-10 nm), other metals like Pb and Cu were bound to colloids of the size > 10 nm. A number of investigations from other landfill sites indicated similar results.