[EE] Evening Poster | A (Atmospheric and Hydrospheric Sciences) | A-GE Geological & Soil Environment

[A-GE31]Subsurface Mass Transport, Material Cycle, and Environmental Assessment

convener:Yuki Kojima(Department of Civil Engineering, Gifu University), Shoichiro Hamamoto(Department of Biological and Environmental Engineering, The University of Tokyo), Hirotaka Saito(東京農工大学大学院農学研究院, 共同), Yasushi Mori(Graduate School of Environmental and Life Science, Okayama University)

Mon. May 21, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe) This session covers the topics on mass transport, water and energy cycles in geoenvironment. Subjects related to laboratory and field measurements, theoretical analysis, and numerical modeling will be discussed. Presentations on geo-pollution, remediation, geological disposal of hazardous wastes, ground source heat utilization, mass transport in vadose zone, soil-water monitoring, and environmental assessment are encouraged.

[AGE31-P12]Charge reversal and aggregation of humic substances: Effect of hydrophobic interactions

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Keywords:Humic substances, aggregation, charge reversal, aggregate strength

Humic substances (HSs) the colloidal macromolecules present in soil and water environment act as recalcitrant organic carbons. These humic substances are transported to surrounding water bodies along with other inorganic and organic ions. The surface charge, sizes, and aggregation of the HSs are also affected by the oppositely charged ions adsorption on its surfaces depending on the pH of the environmental condition. Hydrophobic dyes and pollutants are used recent days in the different industry and released to the surrounding environment affecting the natural functions, binding and releasing ability of ions by HSs. Considering these environmental issues we focus on the charging and aggregation behaviors and properties of HSs aggregates using monovalent hydrophobic cations TPP⁺ (tetraphenylphosphonium ion), CPC (Cetylpyridinium chloride) and also in simple KCI solutions. All the studied humic substances (HSs), Suwannee river fulvic acid (SRFA), Suwannee river humic acid (SRHA) and Leonardite humic acid (LHA) in the presence of hydrophobic cations tetraphenylphosphonium TPP⁺ showed charge reversal and formation of large aggregates. We used Suwannee river fulvic acid (SRFA) and Leonardite humic acid (LHA) in CPC solutions. These HSs in CPC solution also showed charge reversal and formation of large aggregates. The LHA showed large aggregates in all pH especially at low pH in TPPCI solution whereas in CPC solution it shows pronounced aggregation near around iso-electric point especially toward the charge reversal pH of HSs. Meanwhile, the HSs showed no charge inversion in KCI solution. The aggregates of LHA showed higher aggregates strength than SRFA aggregates in CPC measured by the breakup of aggregates subjected to a laminar converging flow.

References

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