



# Modified clay composites as potential landfill covering material

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# Landfills and LFM

- Landfills are considered as places where the life cycle of products ends thus meaning that resources and materials, which before were valuables, become useless and are disposed forever in places away from the sight
- Landfills that were not closed appropriately are of primary importance for re-cultivation followed by soil and groundwater remediation
- Planned actions to reduce and prevent impacts to the environment and get extracted valuables from dump sites are proposed in a new approach known as “landfill mining” (LFM)

# SCOPE OF THE STUDIES

- Soil and groundwater may be contaminated with various pollutants due to the influence of leachate from closed dumps and landfills and it poses significant risks to the environment and human health
- Sustainable landfill closure through LFM process – we need to plan and we need **innovative design for capping material with sorption potential to stop leaching of contaminants**

# TOPICALITY OF THE RESEARCH



The landfills are systems with pollution and aftercare period that takes a long time



Humic substances has own unique chemical category with distinct unique properties, and those might be isolated from the organic mass



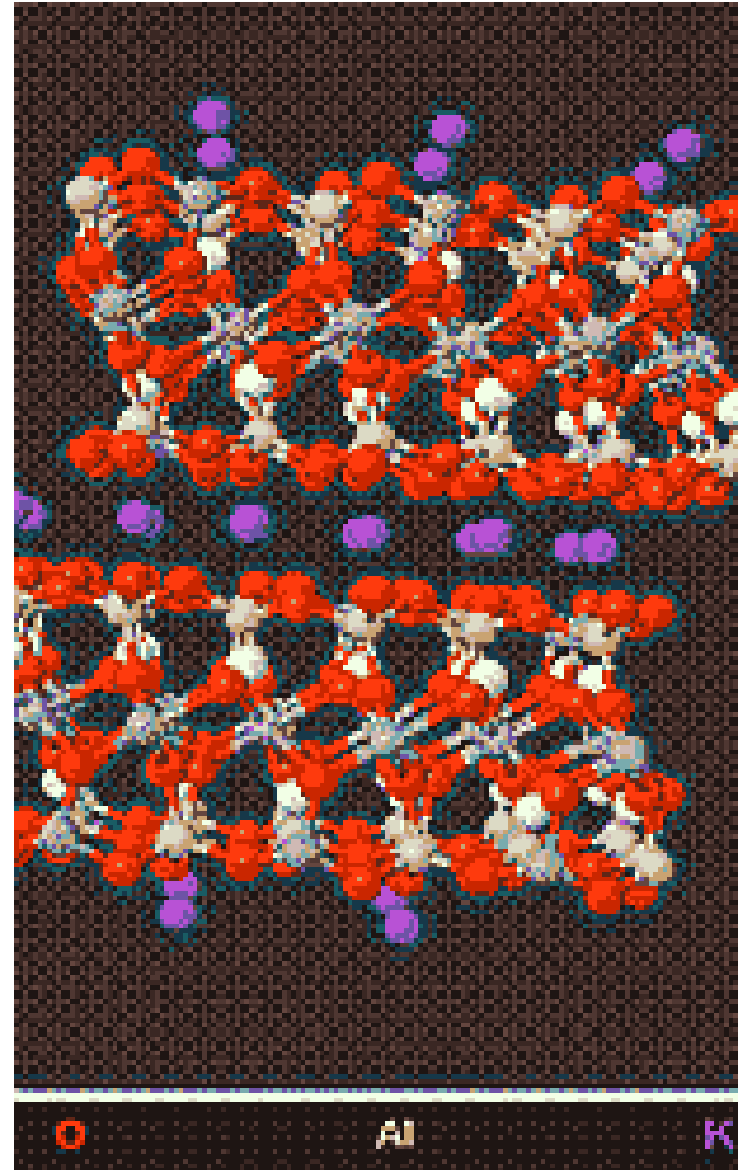
Clay components and humic acids treatment performed to contaminated soil with heavy metals as model contaminants has been done previously and might be a good solution



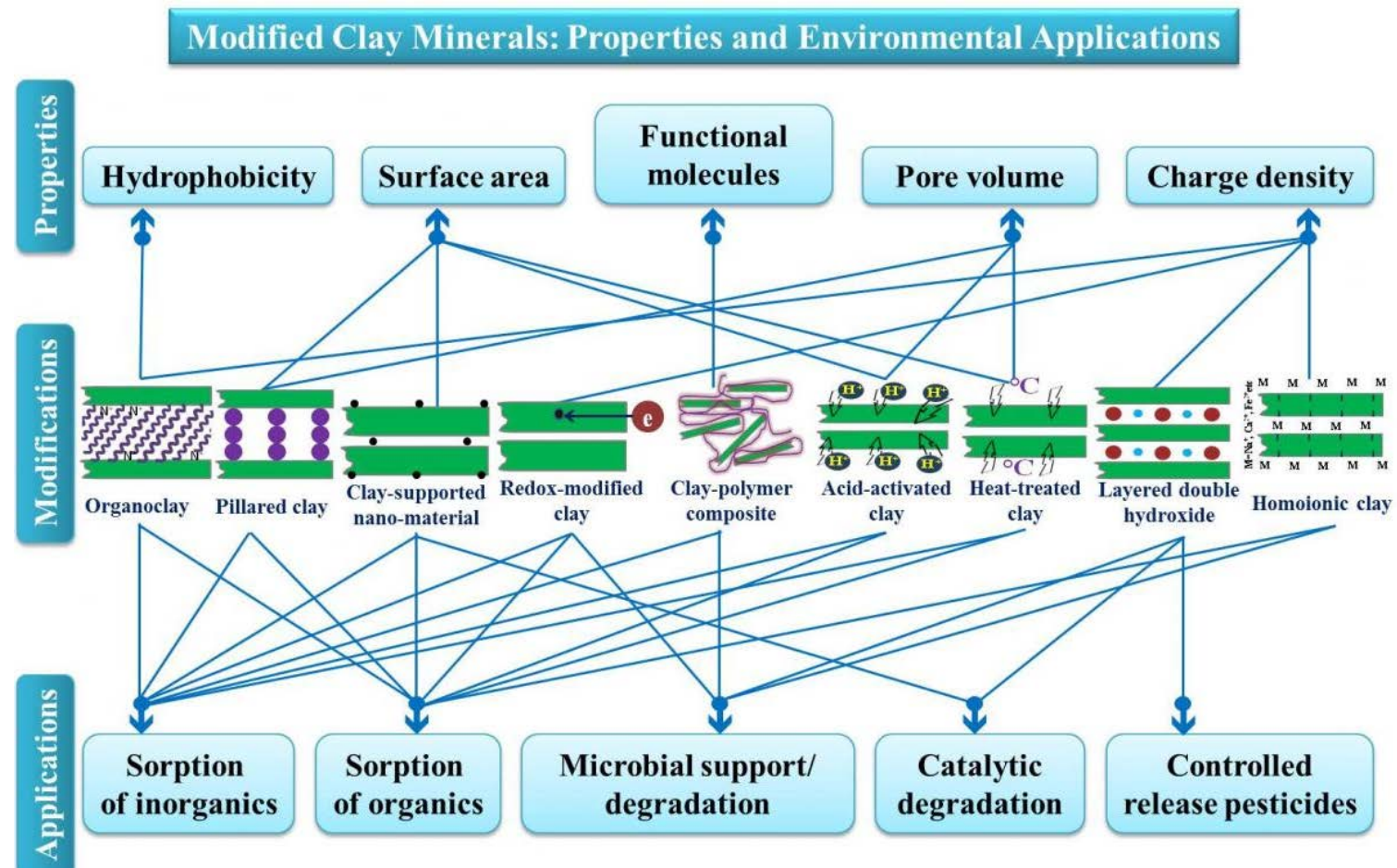
Modified clay may also capture pharmaceuticals which is huge leachate problem at landfills

# CLAY

- Crystalline hydrated aluminosilicate with cage-like structure
- High internal and external surface area with a negative charge neutralized by exchange cations
- Can be suggested as an heavy metal ion removal agent due to its cost-effectiveness and high efficiency
- Hydrophobization process in order to improve interaction with low polarity organic molecules

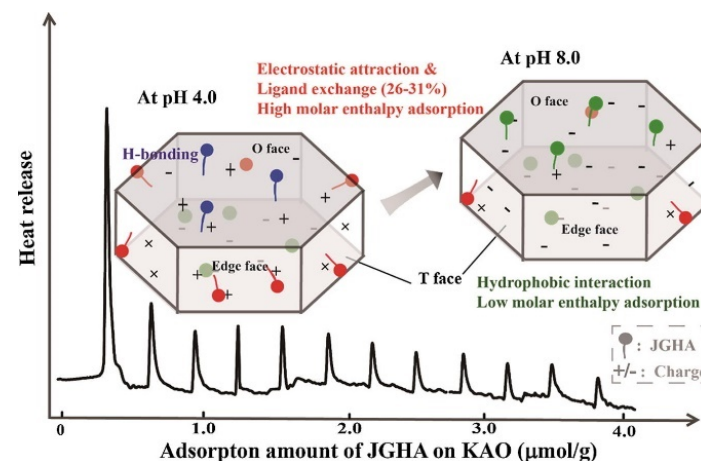
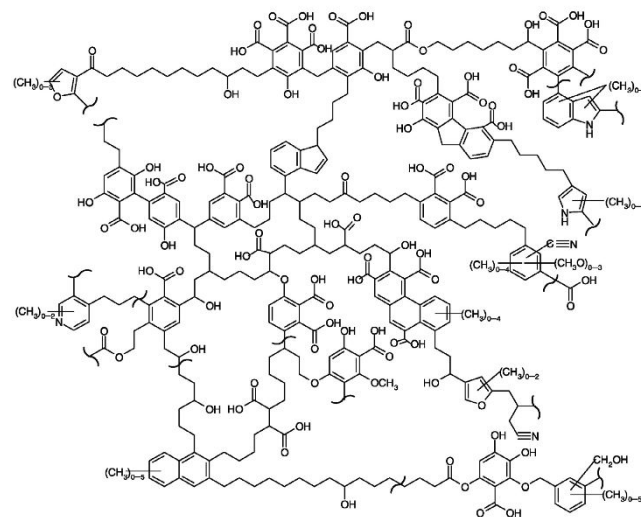


# Clay modification



# NOVELTY

Innovative clay sorbents produced from local resources can be offered for applied remediation



# Summary

- 1) Clay minerals effectively add humic substances
- 2) Clay-humic composites are relevant for reduction of both organic and inorganic pollutants
- 3) Sorption capacities increase, and there is low risk of toxic byproducts from the landfill covering material itself
- 4) Clay-humic composites mixed with other landfill cover constituents would trap toxic contaminants (e.g., pharmaceuticals) found in reworked fine fraction of waste



# References

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THANK YOU  
FOR  
ATTENTION!



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