

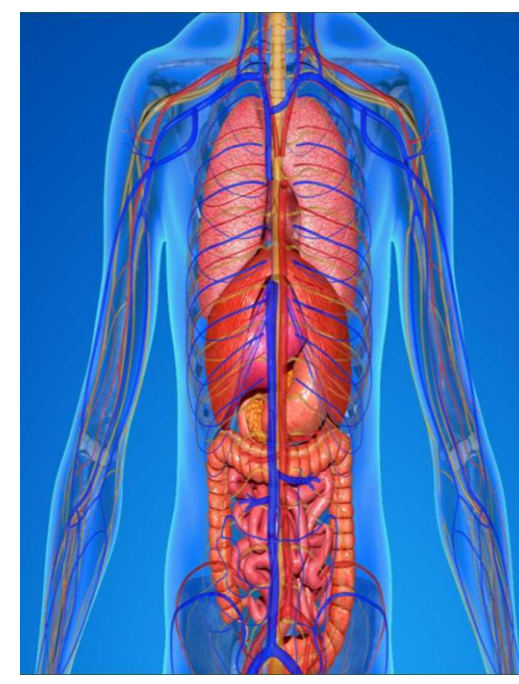
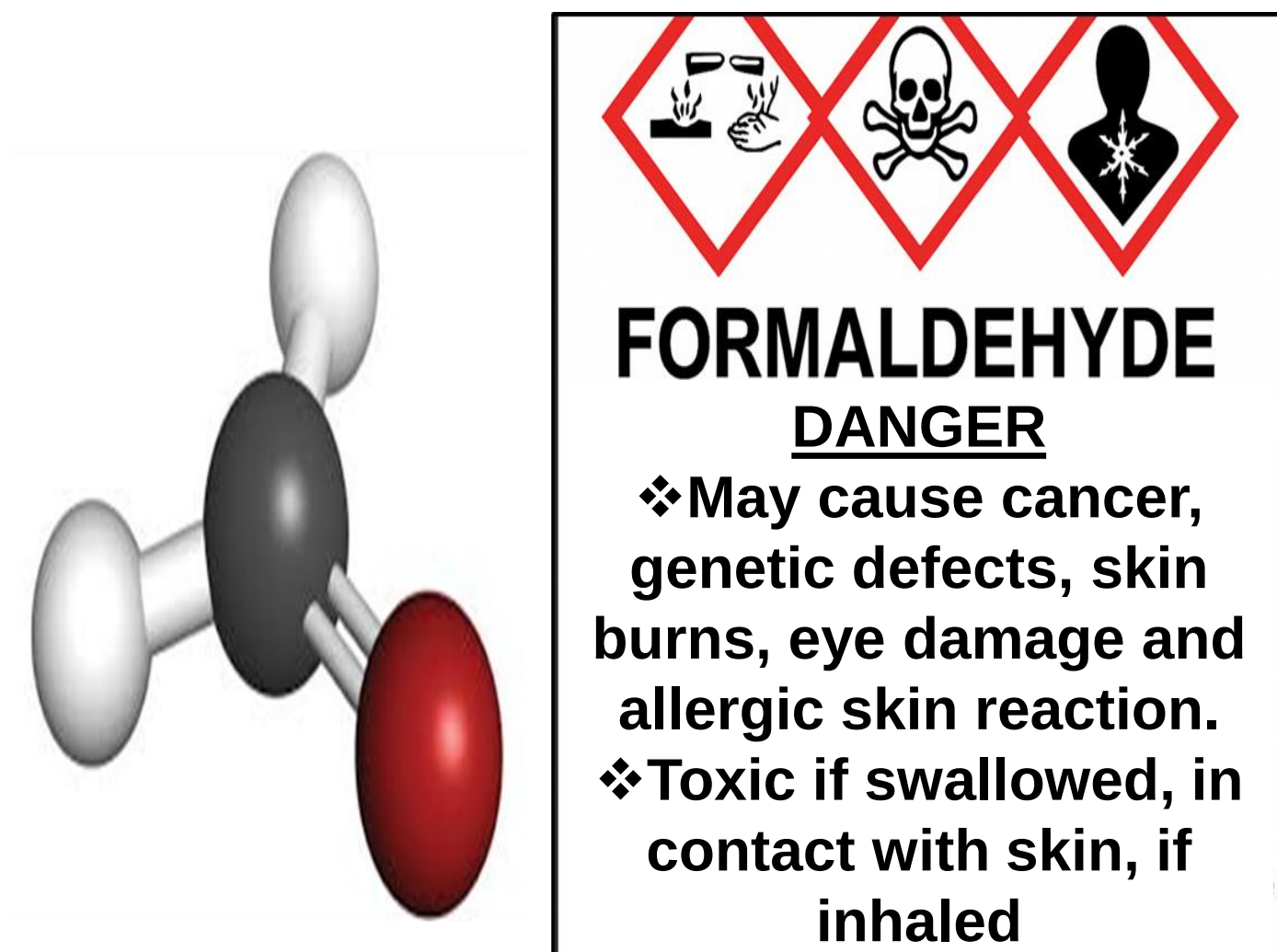
Urea Intercalated Kaolinite : A Sustainable Pathway for Formaldehyde Mitigation

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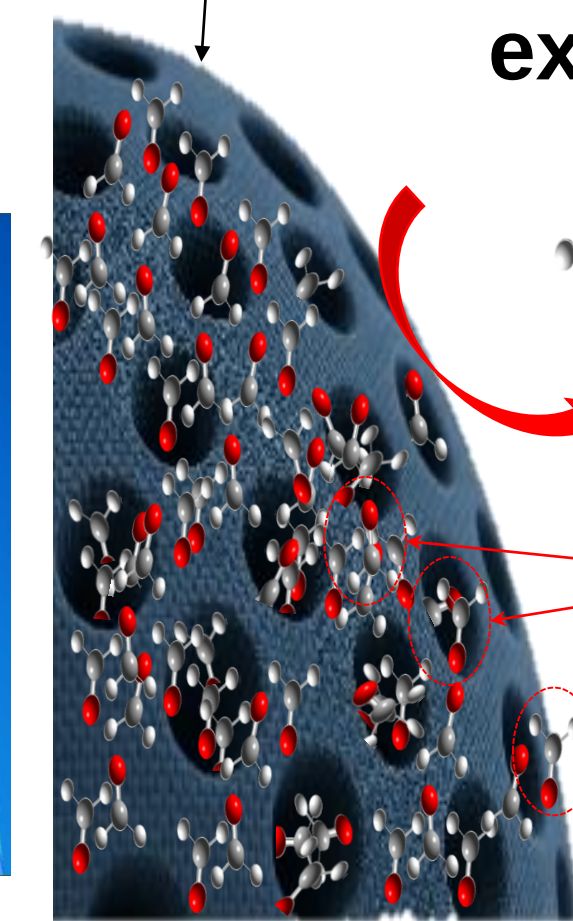


Background



Common adsorbent

➤ Reemission after air exposure under ambient conditions



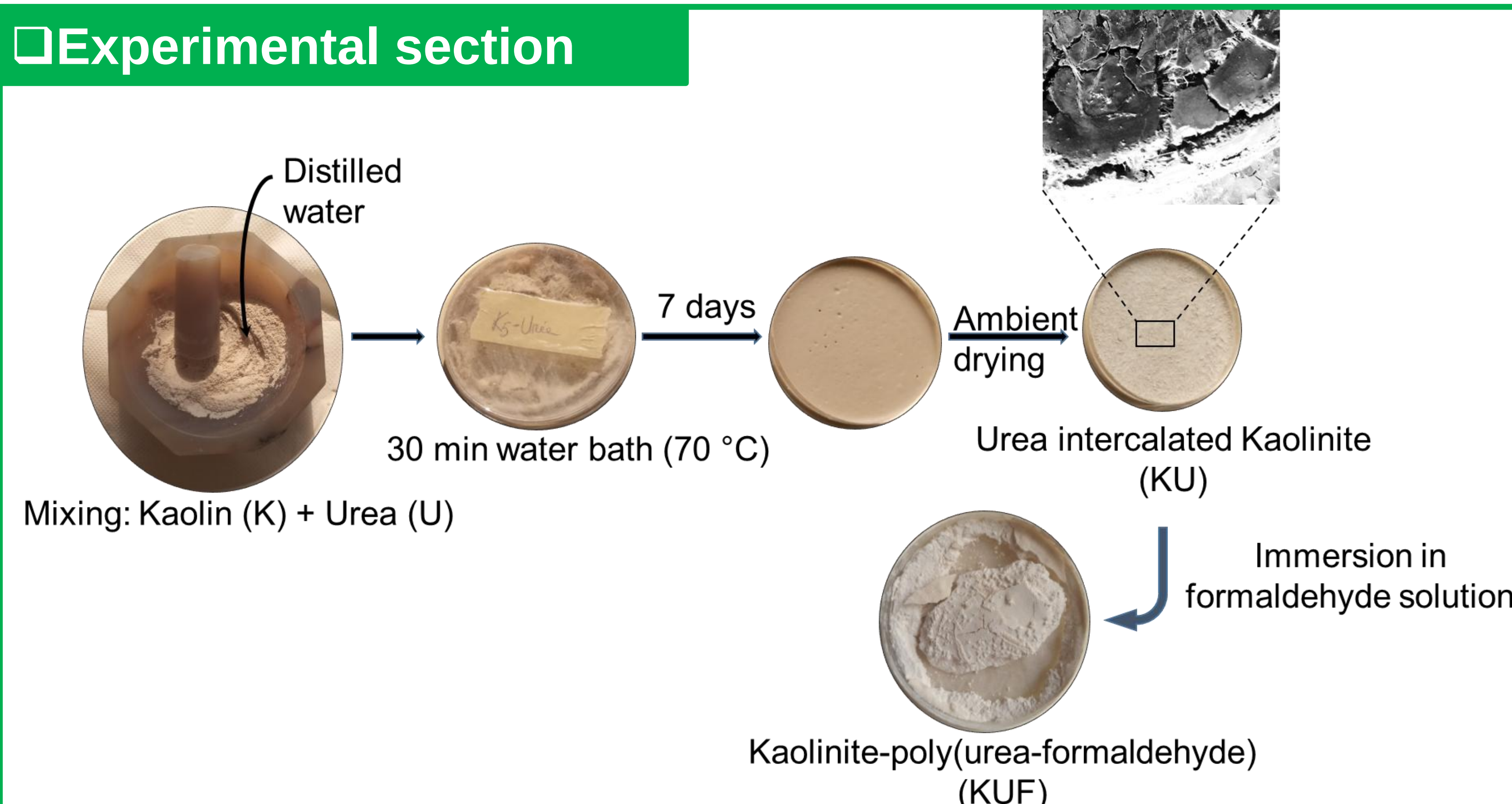
Formaldehyde molecules

Formaldehyde, a Volatile Organic Compound (VOC) found in construction materials, industrial processes, household products and food, causes health concerns after exposure. To address these concerns, researchers have focused on adsorption processes. While effective, **these processes pose challenges regarding its long-term retention.**

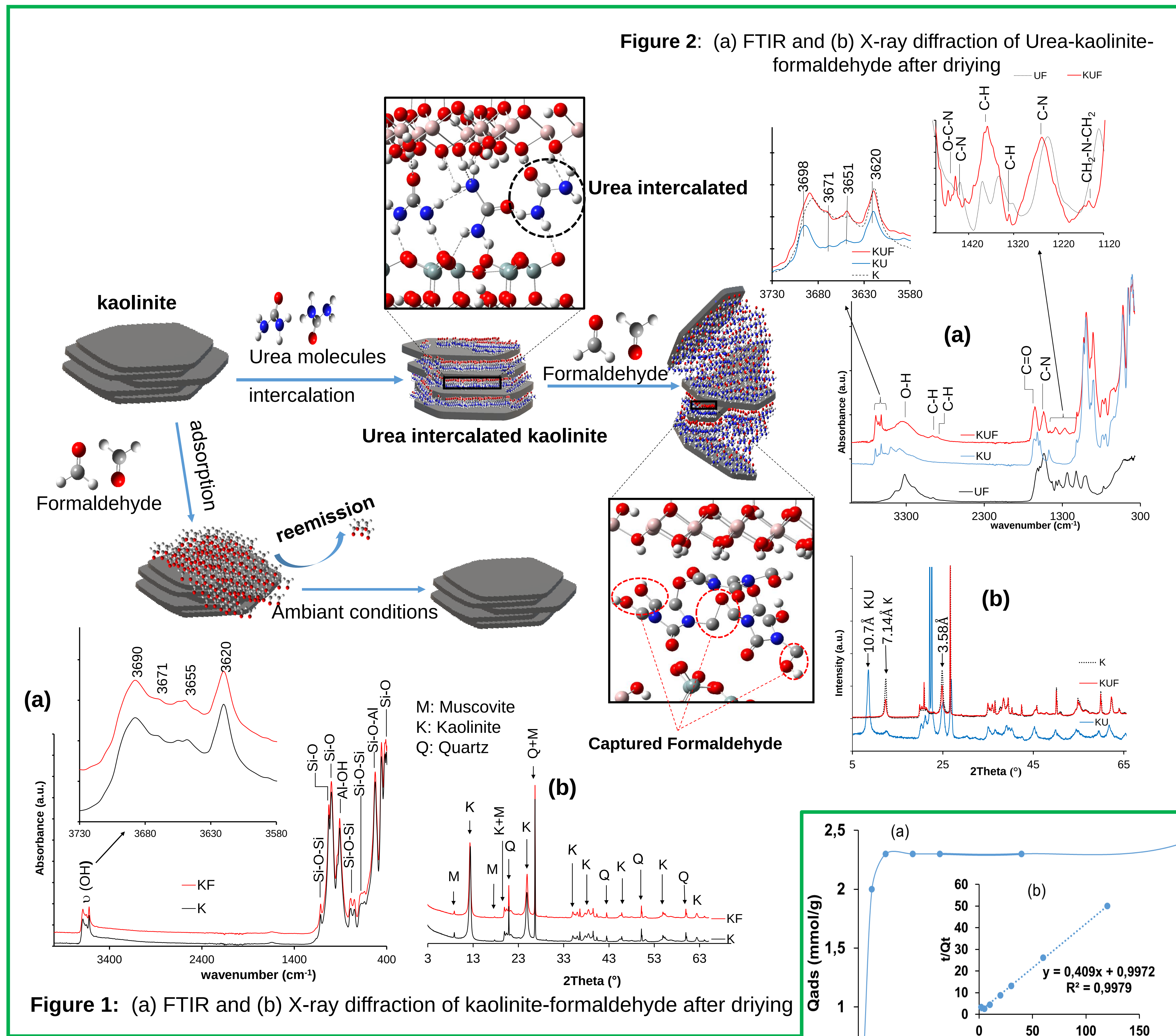


➤ To develop sustainable and efficient formaldehyde capture agent

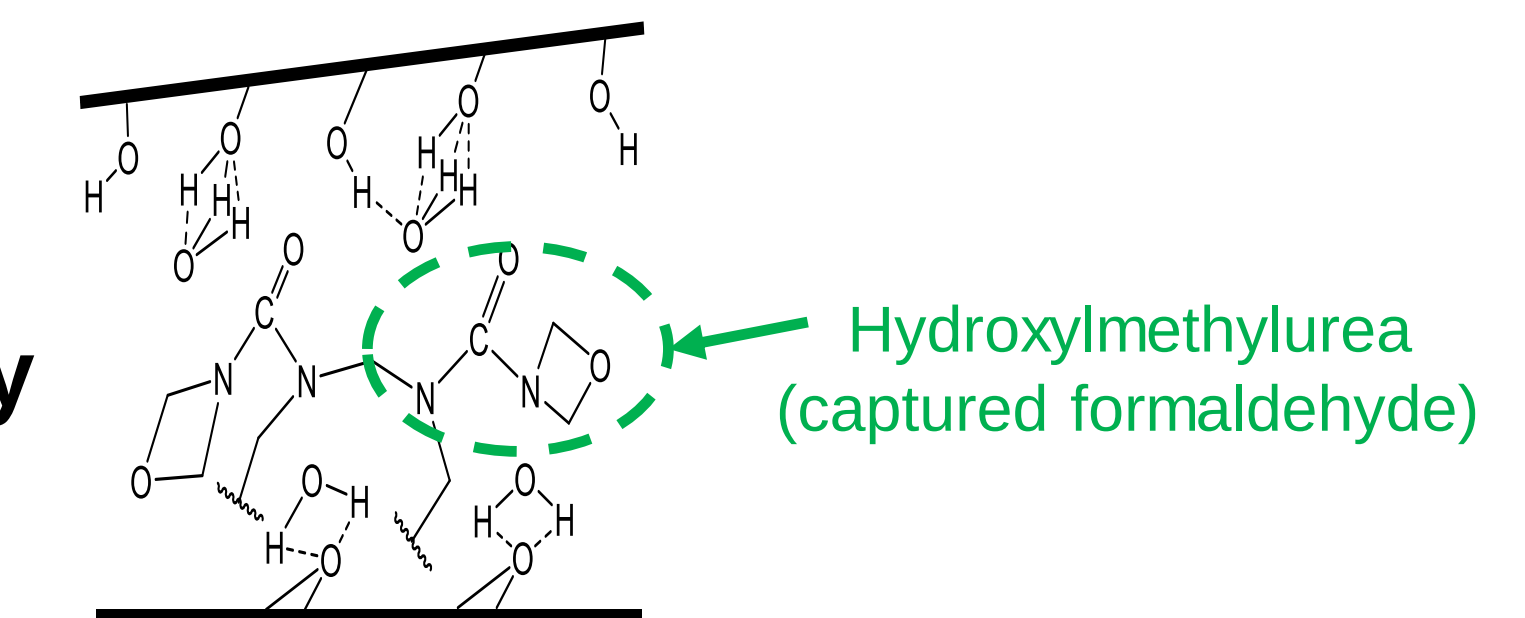
Experimental section



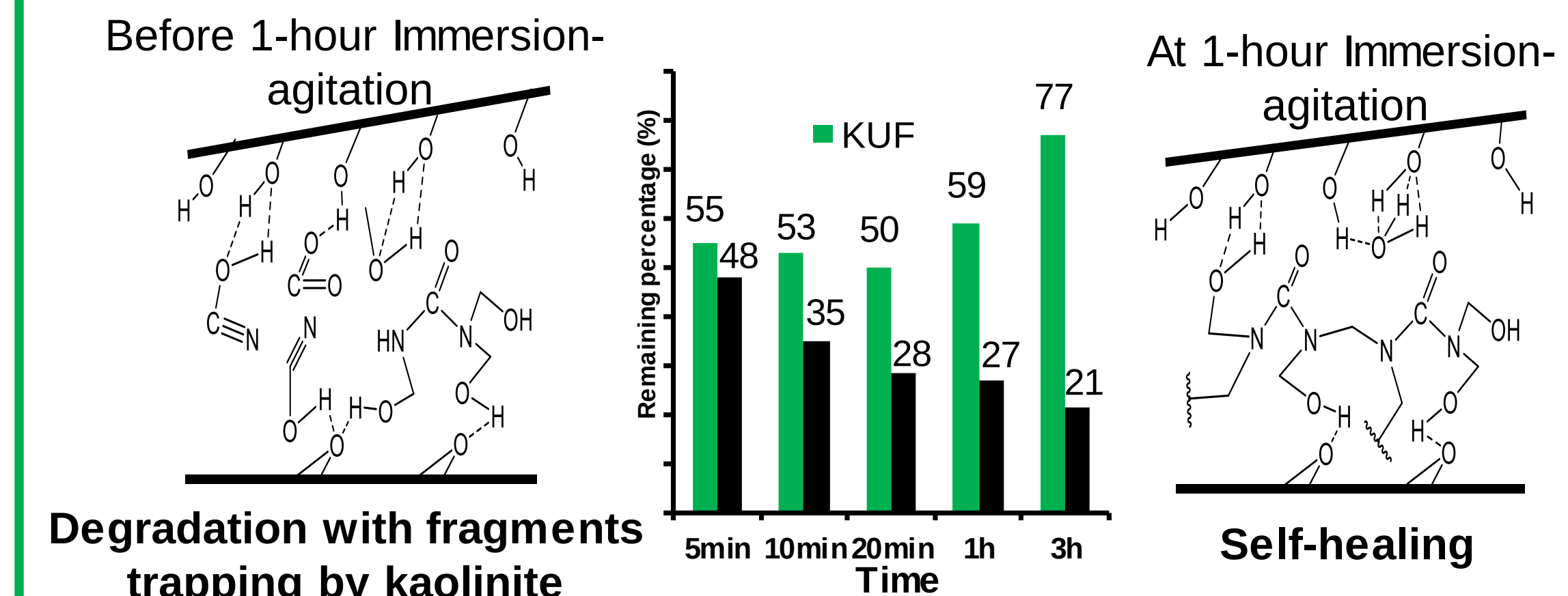
Results



Simulation of the formaldehyde retention durability



Kaolinite/poly(urea-formaldehyde)



Discussions/Conclusion

- Effectiveness of urea intercalation within kaolinite
- Effectiveness of Formaldehyde retention
 - ✓ Formation of hydroxymethylurea bonds
 - ✓ Formaldehyde evaporation in absence of urea intercalated in kaolinite (Fig.1 red)
 - ✓ Production of kaolinite-poly(urea-formaldehyde) nano-composite (KUF).

Capture process

During the two first hours, 1 g of KU captures 2,4 mmol of formaldehyde by hydroxymethylurea linkages at the constant rate of 0.17 min⁻¹.

Long-term retention

Self-healing capacity observed at 1 hour after water immersion-agitation.

Further works

- Study the capture and retention process in highest period
- Enhance the formaldehyde retention capacity

References

IARC, W.G. on the E. of C.R. to H. (2006). Formaldehyde, 2-Butoxyethanol and 1-tert-Butoxypropan-2-ol. IARC monographs on the evaluation of carcinogenic risks to humans. International Agency for Research on Cancer, Lyon, France Geneva.
Chiavarini, M., Bigatto, R., and Conti, N. (1978). Die Angewandte Makromolekulare Chemie 70 (1020): 49–58. doi:<https://doi.org/10.1002/apmc.1978.050700105>.