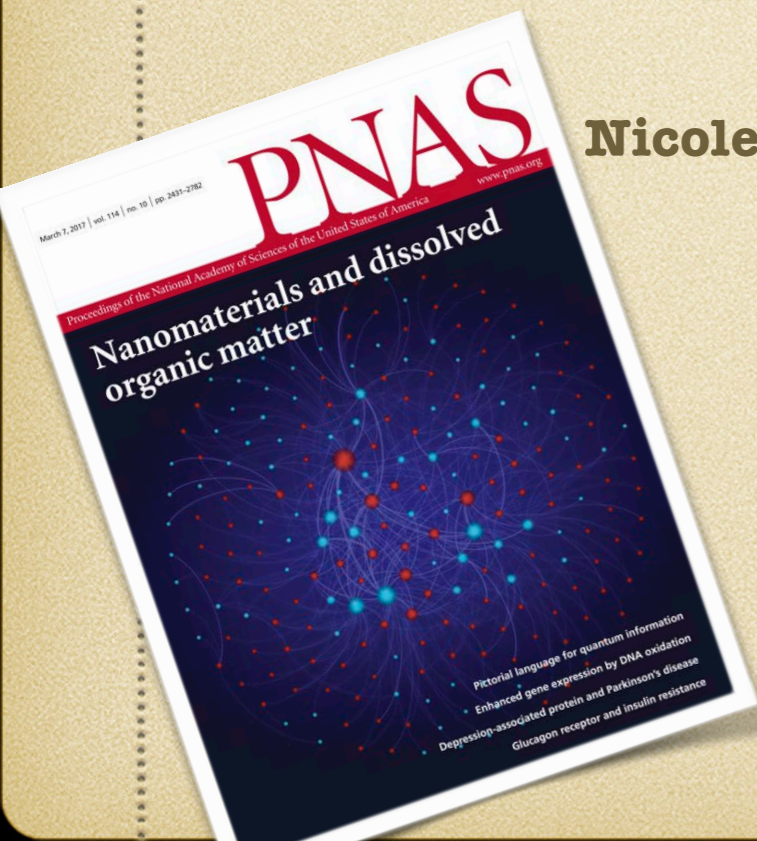
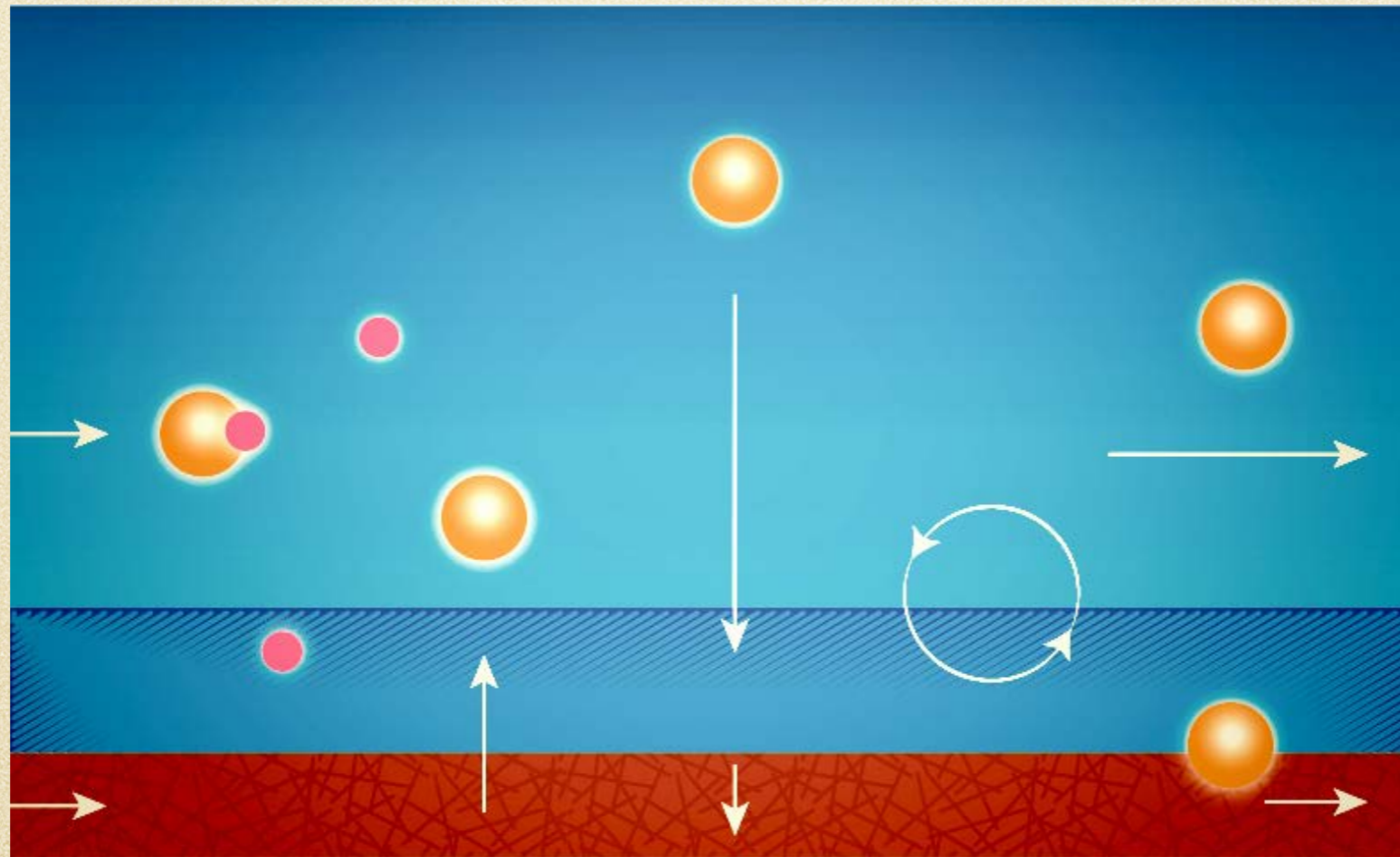


# A network perspective reveals decreasing material diversity in studies on nanoparticle interactions with dissolved organic matter

**Nicole Sani-Kast**, Jérôme Labille, Patrick Ollivier, Danielle Slomberg,  
Konrad Hungerbühler, and Martin Scheringer



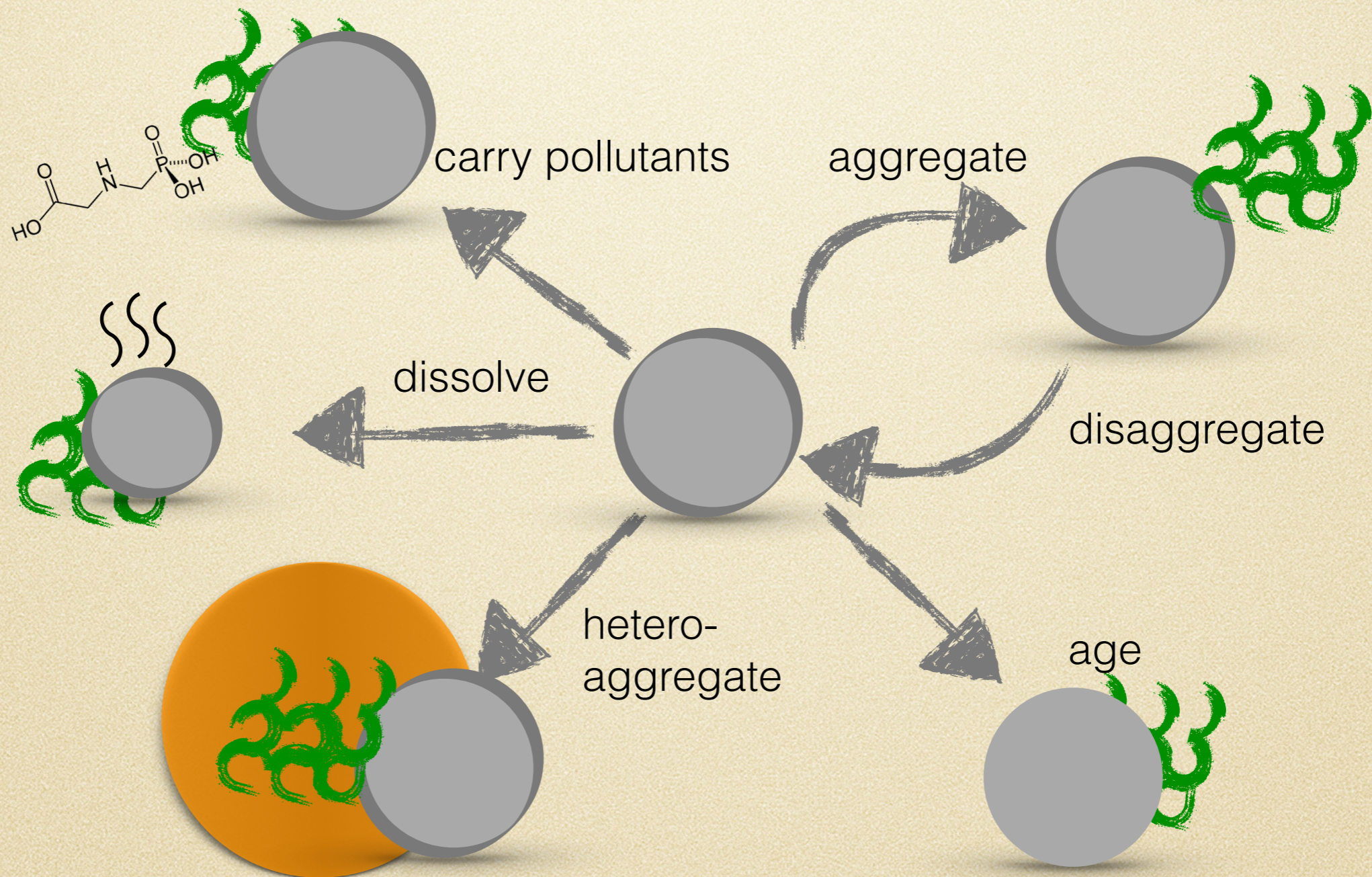
# ENP\* environmental fate model



● \*engineered nanoparticle

● suspended particulate matter

# the role of DOM\*



\*dissolved organic matter

Aiken et al. (2011)

Louie et al. (2016)

# diversity of studied materials

“Additional studies are also needed to assess interactions among a **broader variety of chemical classes** of macromolecules in the environment, including humic substances, polysaccharides, and proteins.”<sup>1</sup>

“Incorporating data across a **variety of ENM types** (metals, metal oxides, etc.), will require a much larger data set and present a significant challenge.”<sup>1</sup>

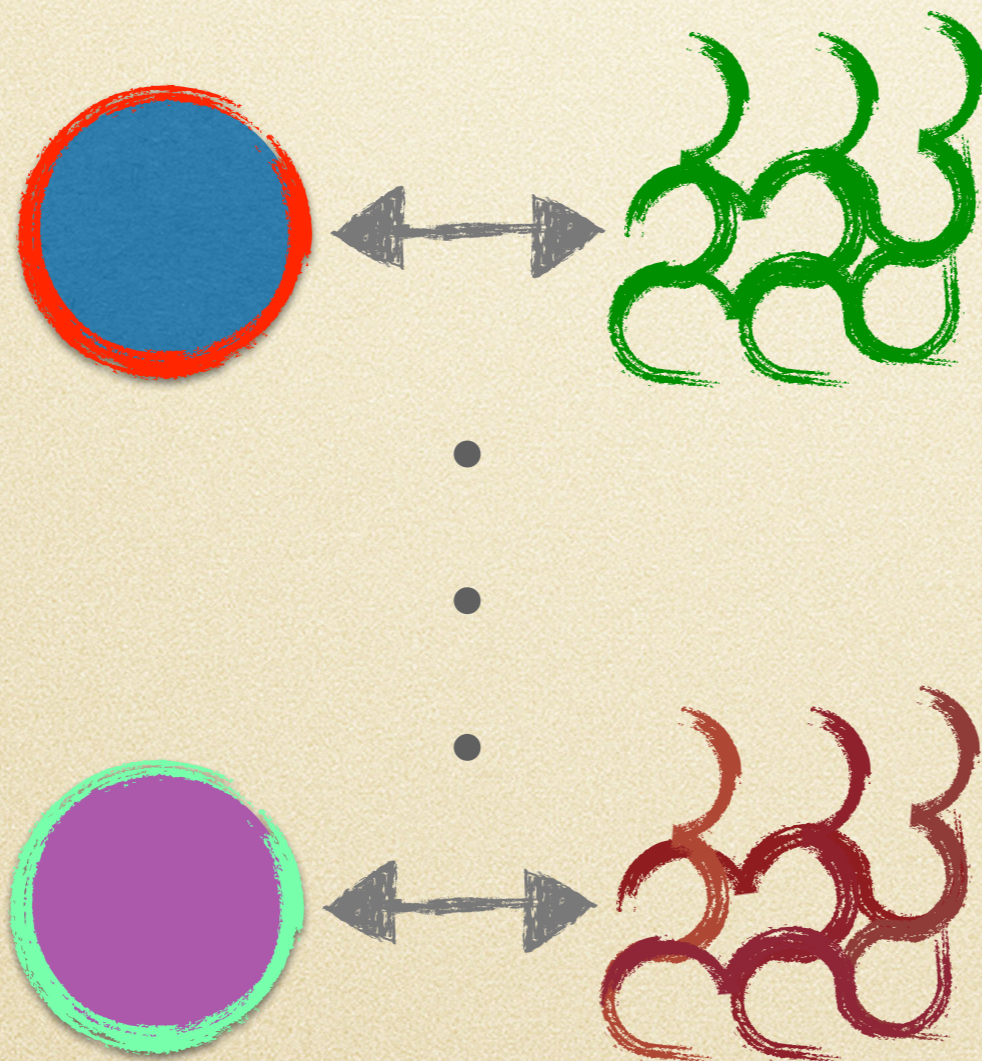
“....there is a **clear predominance of humic acids** followed by fulvic acids, mostly standard materials. This raises the question of the environmental representativeness of such compounds. When used, **proteins are also mostly standard materials isolated from various organisms and rarely from natural waters or soil.**”<sup>2</sup>

<sup>1</sup>Louie et al. (2016)

<sup>2</sup> Philippe and Schaumann (2014)

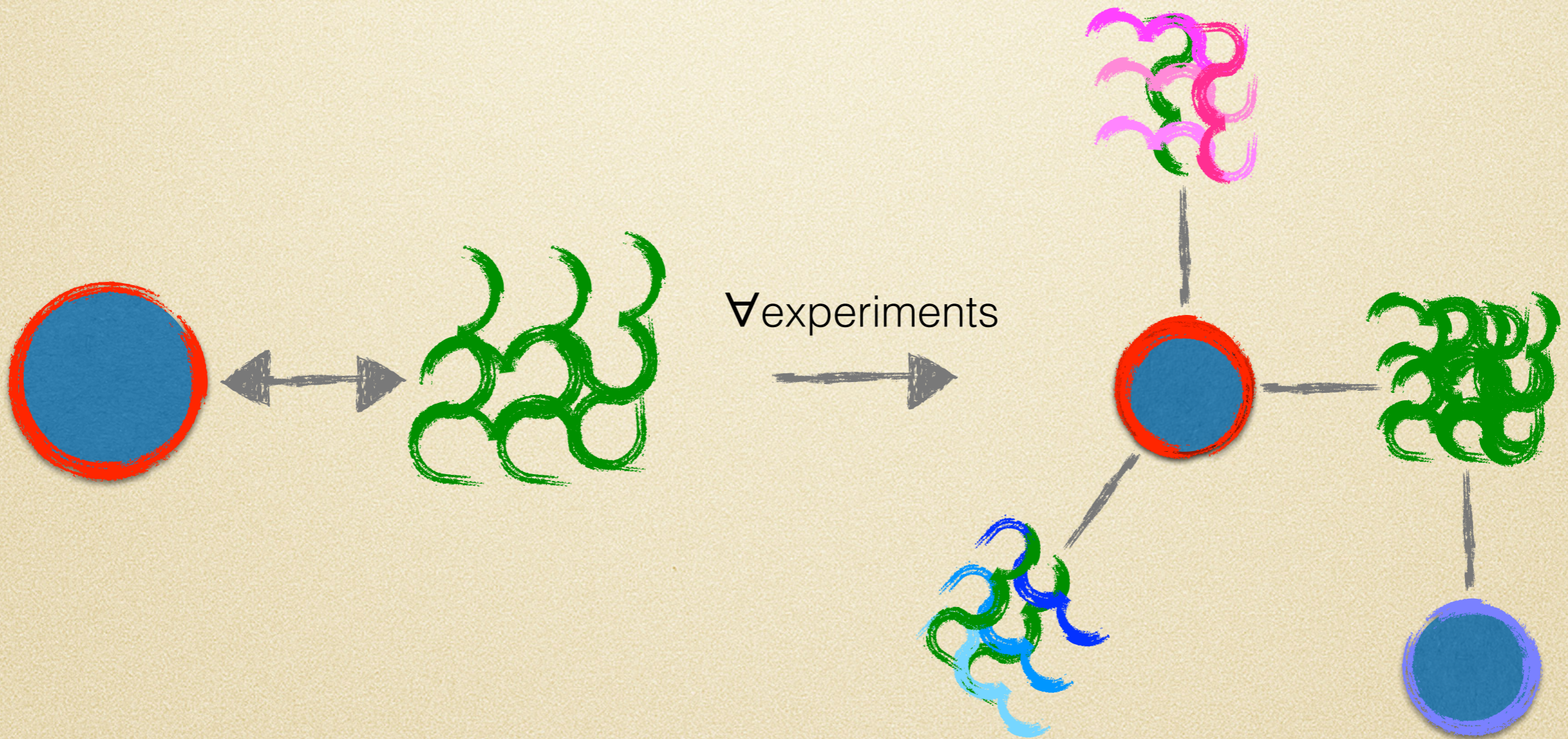
how to quantify **diversity**?

# available data

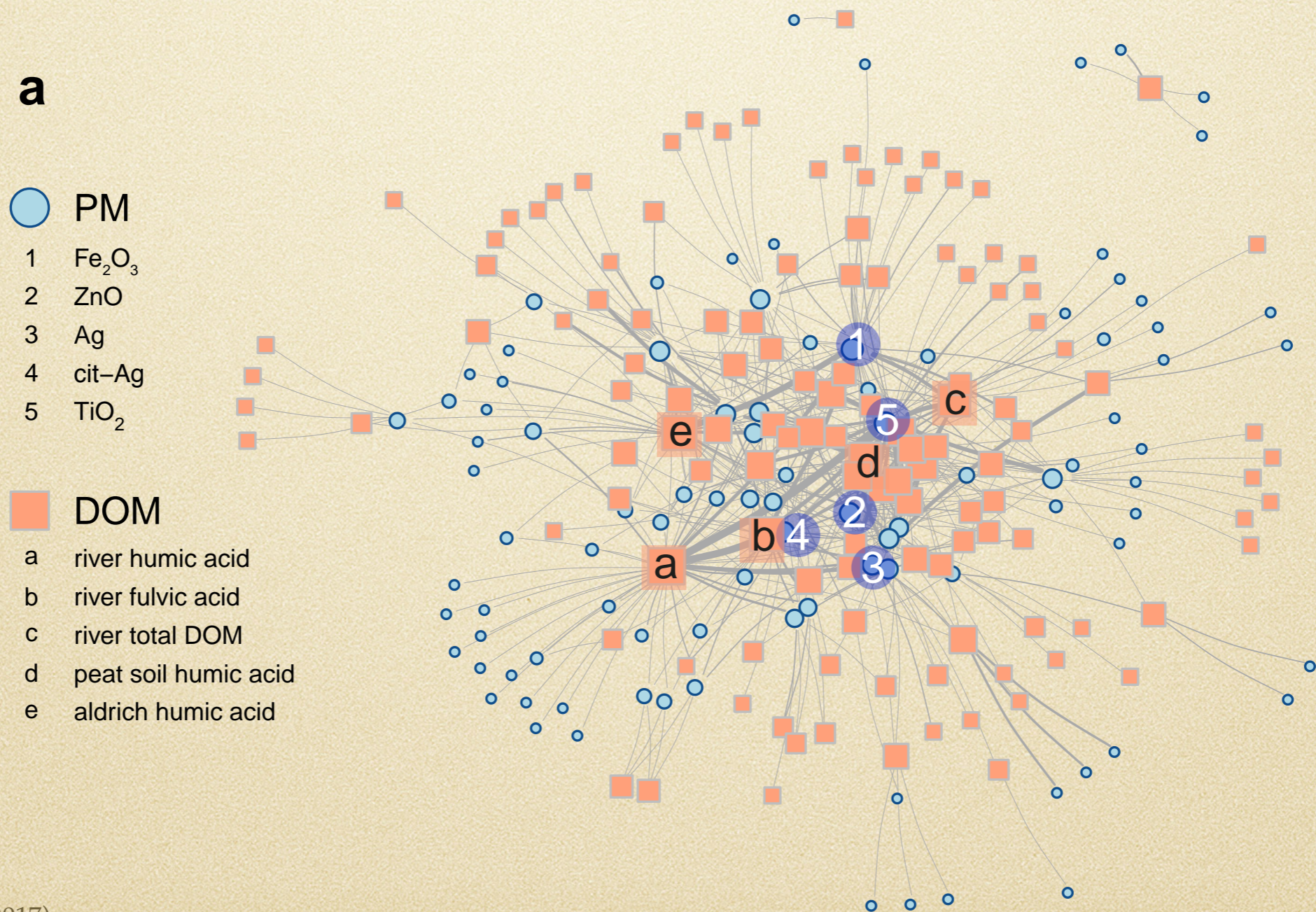


~950 pairs of  
studied DOM and  
nanoparticles  
from 260  
experimental  
papers

bringing it all together

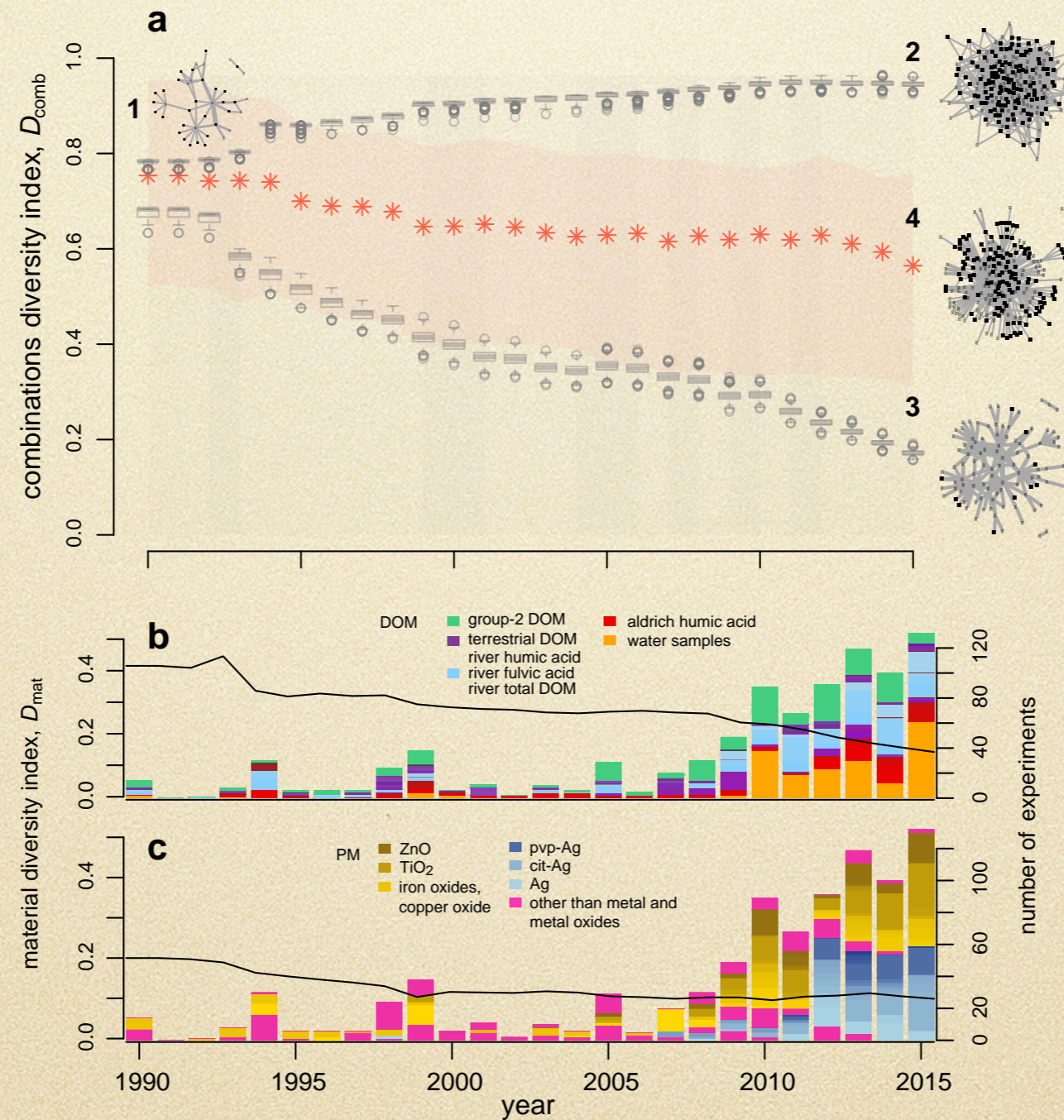


# research focus on certain materials





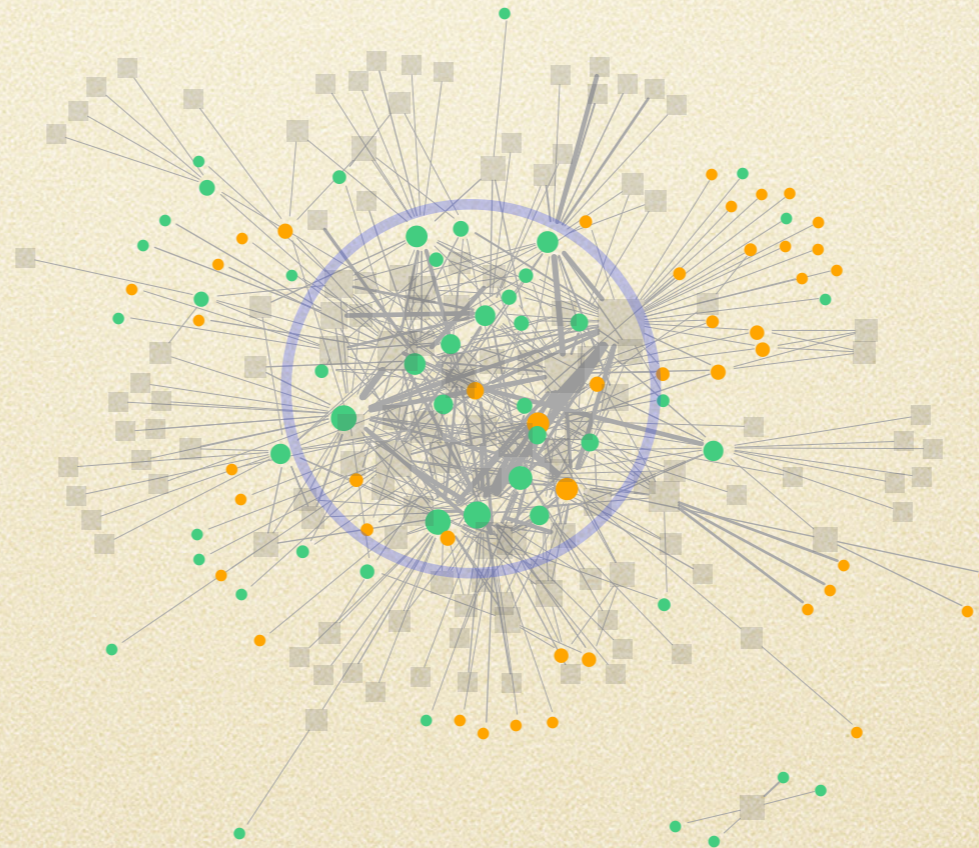
# a decrease in the number of newly studied materials



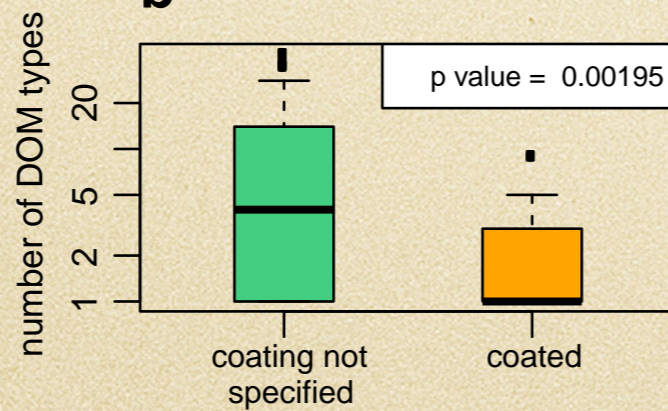
# focus on simplified systems

**a**

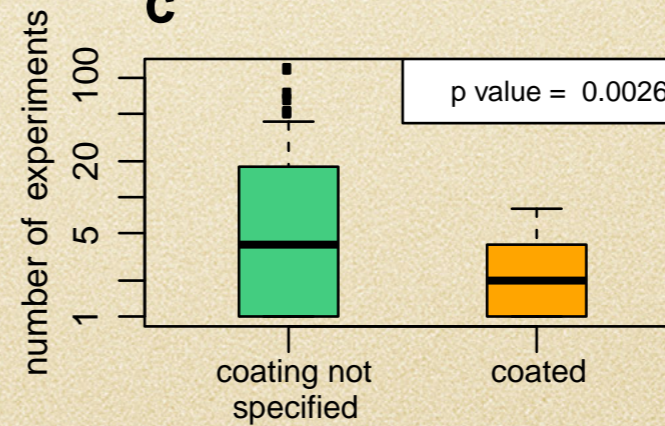
- coated PM
- PM with unspecified coating
- DOM



**b**

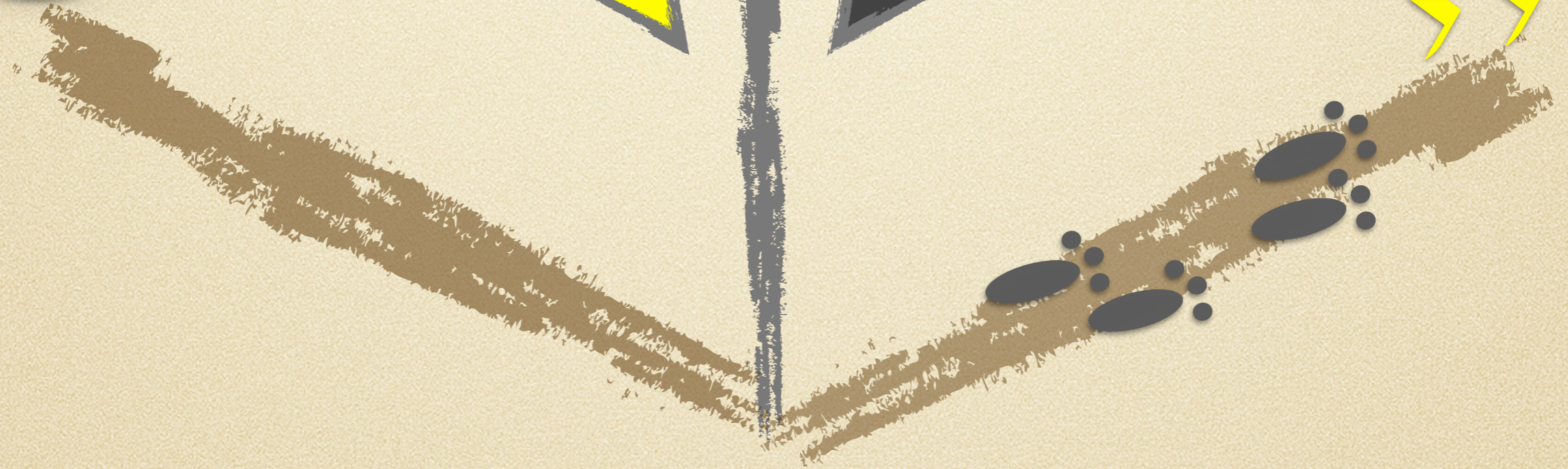
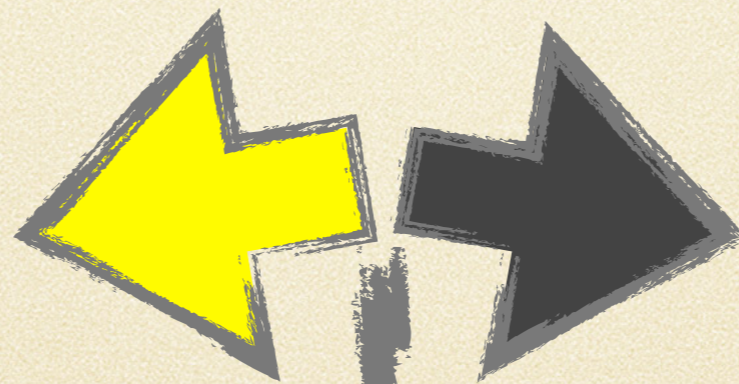


**c**



conclusions

experimental design is not  
explained by certain research  
needs





# acknowledgements

Eli Goldberg

SETG group

Thomas Kast

thank you! 😄💧

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