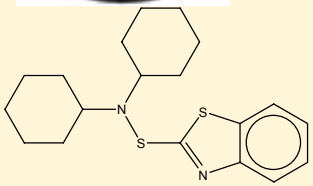
Generic emission model

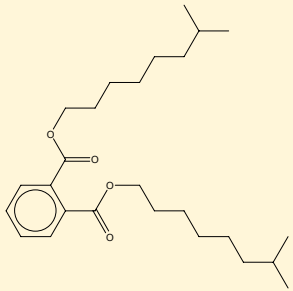
- Can be used for all organic chemicals
- Litterature data used for material specific calibration
- Can be applied to any emission scenario

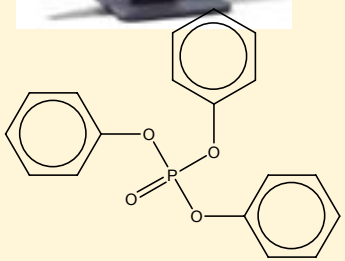
ChEmiTecs

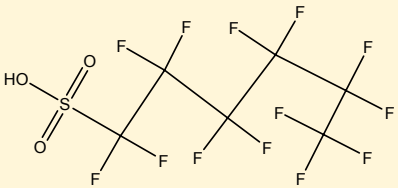
Kemikalier i fokus

7160 substanser
H/LPVC
Additiv









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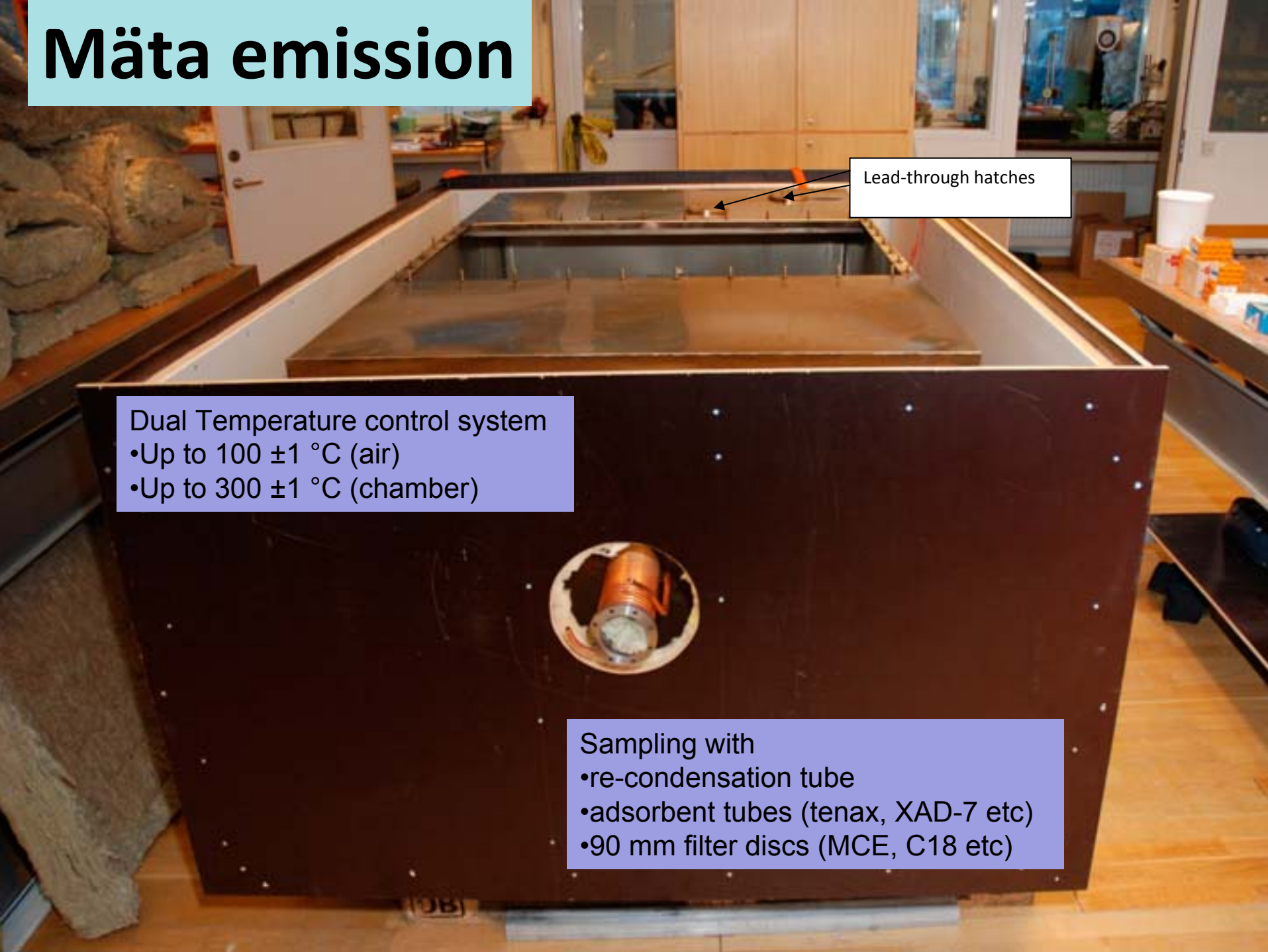
Mäta emission



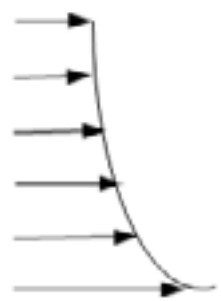
Dual Temperature control system
- Up to 100 ±1 °C (air)
- Up to 300 ±1 °C (chamber)

Sampling with
- re-condensation tube
- adsorbent tubes (tenax, XAD-7 etc)
- 90 mm filter discs (MCE, C18 etc)

Emission modelling

Convection mass transfer coefficient , h_m

$$h_m = \frac{D_a}{x} 0.664 \left(\frac{u_m \rho_a x}{\mu_a} \right)^{1/2} \left(\frac{\mu_a}{D_a \rho_a} \right)^{1/3}$$



Partition in equilibrium at boundary layer, $K_{M/A}$

$$RT \ln K_{M/A} = c + aA + bB + eE + sS + lL$$

Diffusion in material, D

$$D = \exp\left(Ap - 0.1351(Mw)^{2/3} + 0.003Mw - \frac{10450}{T} \right)$$

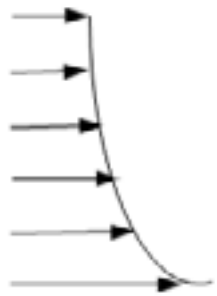
ChEmiTecs

Emission modelling

Air velocity dependent

Convection mass transfer coefficient , h_m

$$h_m = \frac{D_a}{x} 0.664 \left(\frac{u_m \rho_a x}{\mu_a} \right)^{1/2} \left(\frac{\mu_a}{D_a \rho_a} \right)^{1/3}$$



Partition in equilibrium at boundary layer, $K_{M/A}$

$$RT \ln K_{M/A} = c + aA + bB + eE + sS + lL$$

Very compound dependent

Very material dependent

Diffusion in material, D

$$D = \exp\left(Ap - 0.1351(Mw)^{2/3} + 0.003Mw - \frac{10450}{T} \right)$$

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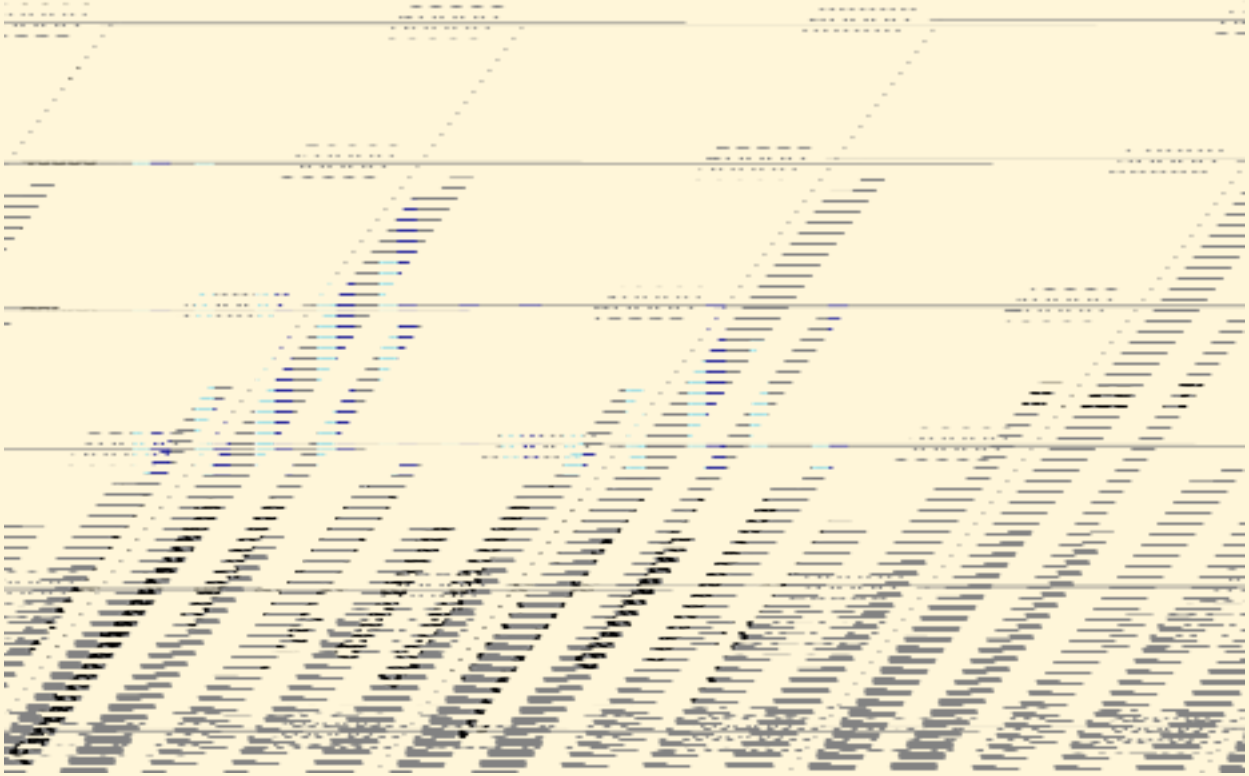
Method comparison

Emissions of plastic additives



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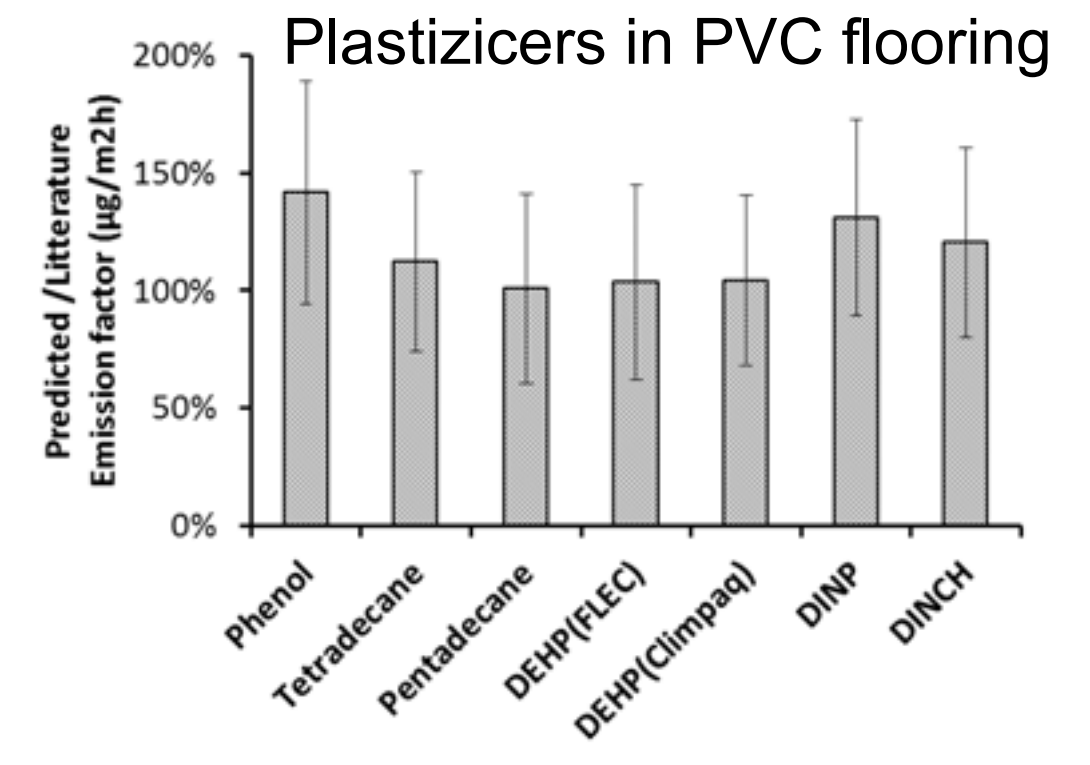
Method validation



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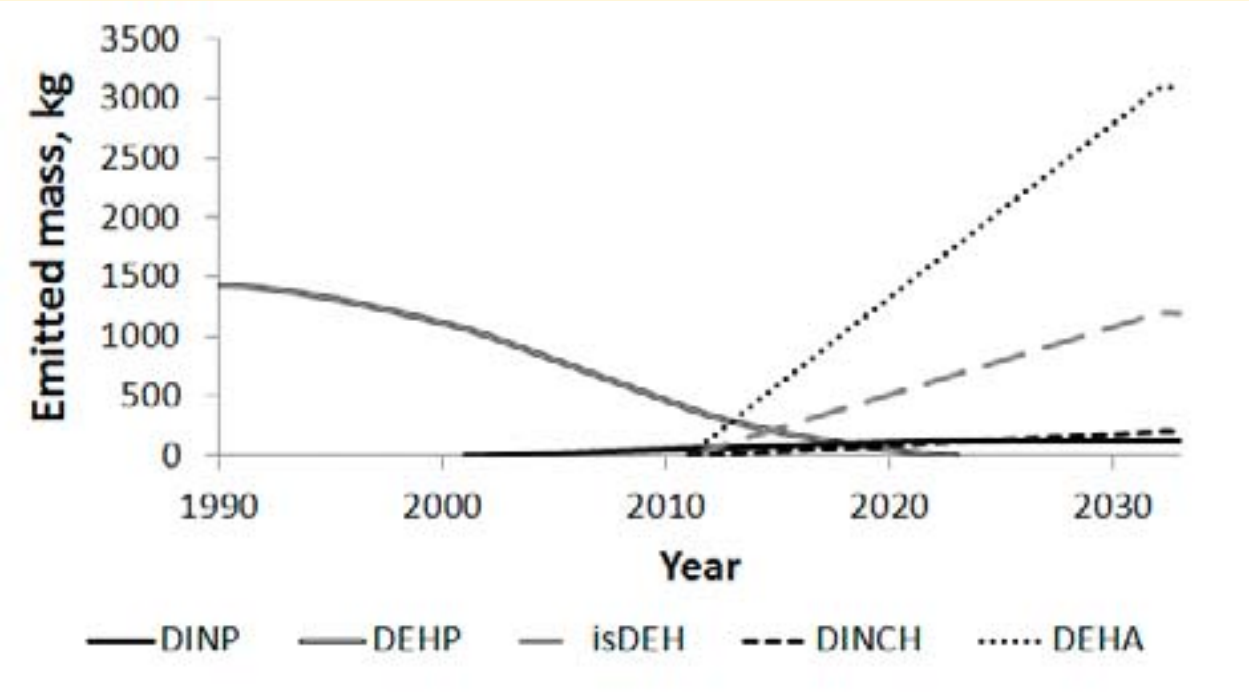
Retrospective/furure time trends



DEHP: Di(2-ethylhexyl)phthalate
DINP: Di-*iso*-nonyl phthalate
DEHA: Di(2-ethylhexyl)adipate
DINCH: Di-*iso*-nonyl-1,2-cyclohexanedicarboxylic acid ester
isDEH: Di-*iso*-nonylphthalate diethyl hexyl-*iso*-sorbide

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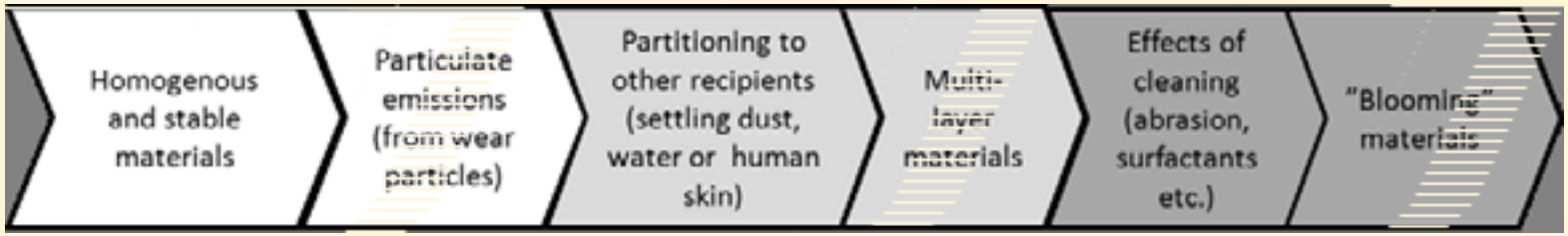
Further developments



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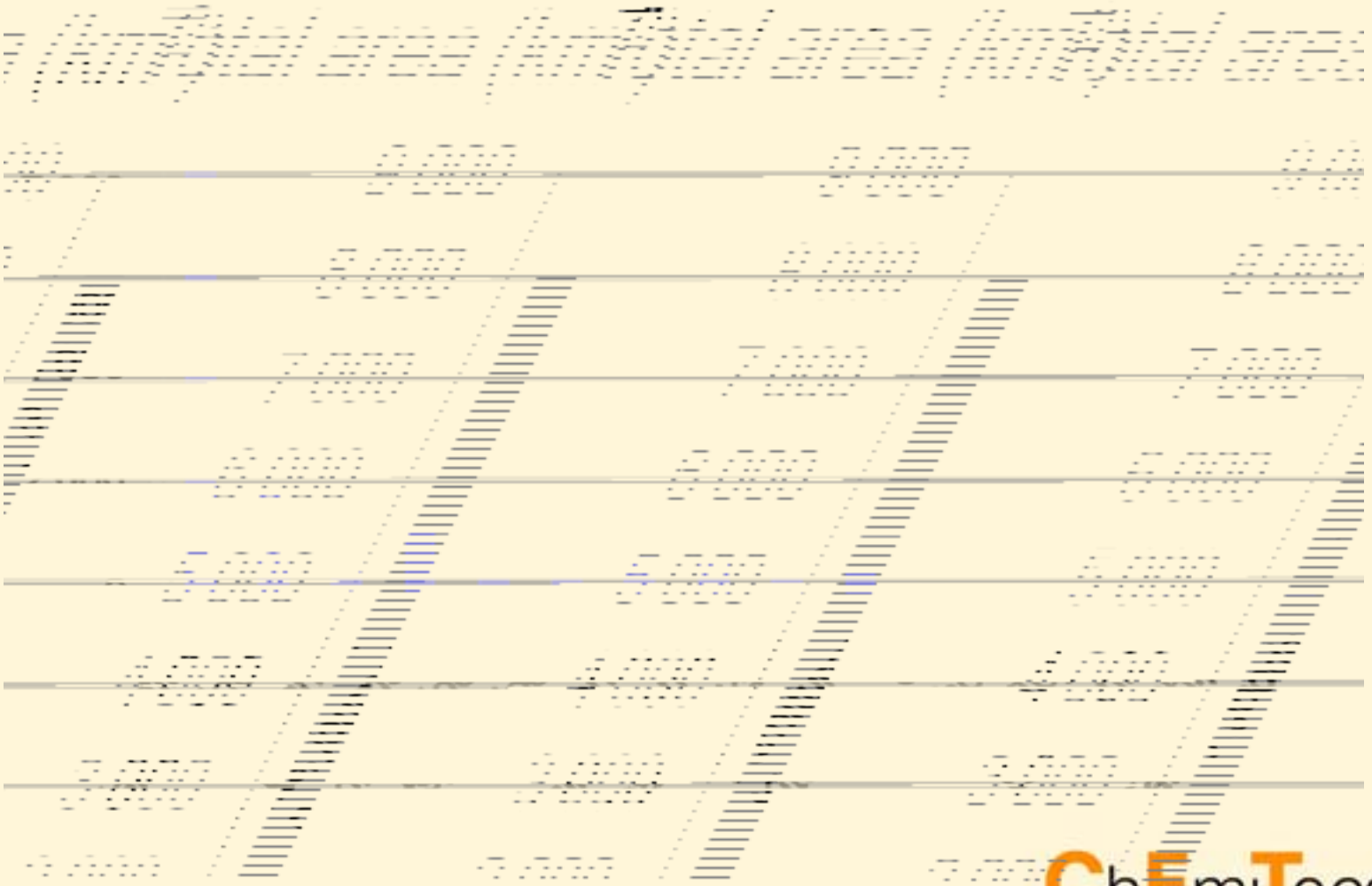
Where do all the stuff come from?



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Prioritization

Prio = Area×Chemicals×Emission Drivers

Examples of prioritized goods:

- Textiles
- Paint and varnish
- Flooring materials
- Rood vehicles
- Furnitures
- Electronics

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Annual Economy Wide Emissions

- Prioritized goods
- Data collection
  - Surface area
  - Average material composition
  - Average chemical composition
- Generic modeling
- Dimensioning
- Actions?
- Communication!

ChEmiTecs

Annual Economy Wide Emissions

- Prioritized goods
- Data collection
  - Surface area
  - Average material composition
  - Average chemical composition
- Generic modeling
- Dimensioning
- Actions?
- Communication!

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