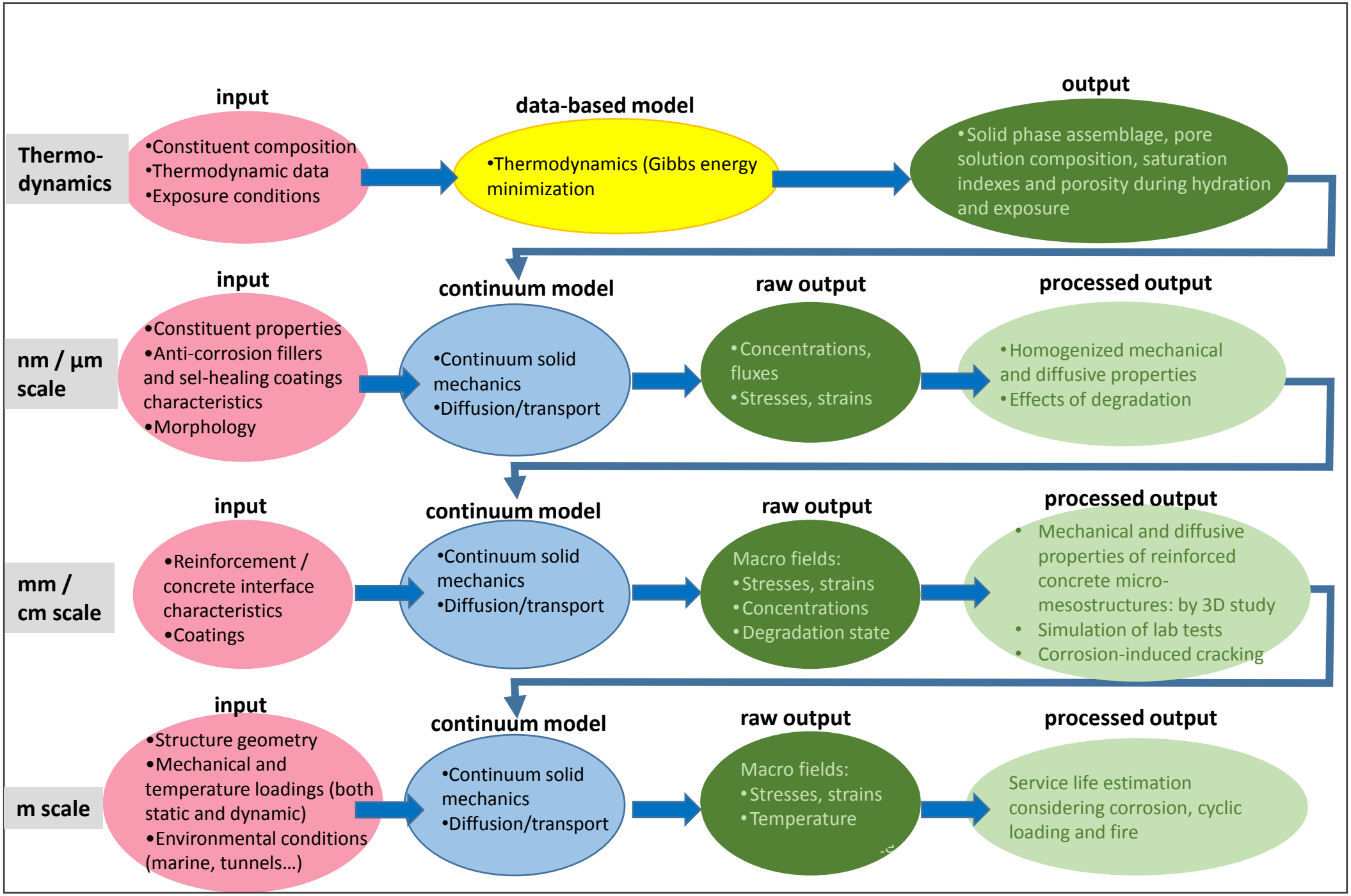
Thermo-dynamics
input
•Constituent composition
•Thermodynamic data
•Exposure conditions
data-based model
•Thermodynamics (Gibbs energy minimization
output
•Solid phase assemblage, pore solution composition, saturation indexes and porosity during hydration and exposure
nm / µm scale
input
•Constituent properties
•Anti-corrosion fillers and sel-healing coatings characteristics
•Morphology
continuum model
•Continuum solid mechanics
•Diffusion/transport
raw output
•Concentrations, fluxes
•Stresses, strains
processed output
•Homogenized mechanical and diffusive properties
•Effects of degradation
mm / cm scale
input
•Reinforcement / concrete interface characteristics
•Coatings
continuum model
•Continuum solid mechanics
•Diffusion/transport
raw output
Macro fields:
•Stresses, strains
•Concentrations
•Degradation state
processed output
• Mechanical and diffusive properties of reinforced concrete micro-mesostructures: by 3D study
• Simulation of lab tests
• Corrosion-induced cracking
m scale
input
•Structure geometry
•Mechanical and temperature loadings (both static and dynamic)
•Environmental conditions (marine, tunnels…)
continuum model
•Continuum solid mechanics
•Diffusion/transport
raw output
Macro fields:
•Stresses, strains
•Temperature
processed output
Service life estimation considering corrosion, cyclic loading and fire
Associated Tasks
T4.2.1 Simulation of the phase assemblage of novel binders
T4.2.2 Multiscale modelling of mechanical and diffusive properties:
T4.3 Computational analyses of micro-mesostructures
T4.4 Computational analyses of macrostructures for service life estimation