

```

template <typename real_t, backend_t backend>
struct particles_t: particles_proto_t<real_t>
{
    // initialisation
    void init(
        const arrinfo_t<real_t> th,
        const arrinfo_t<real_t> rv,
        const arrinfo_t<real_t> rhod,
        const arrinfo_t<real_t> courant_x,
        const arrinfo_t<real_t> courant_y,
        const arrinfo_t<real_t> courant_z,
        const std::map<
            enum chem_species_t,
            const arrinfo_t<real_t>
        > ambient_chem
    );

    // time-stepping methods
    void step_sync(
        const opts_t<real_t> &,
        arrinfo_t<real_t> th,
        arrinfo_t<real_t> rv,
        const arrinfo_t<real_t> rhod,
        const arrinfo_t<real_t> courant_x,
        const arrinfo_t<real_t> courant_y,
        const arrinfo_t<real_t> courant_z,
        std::map<
            enum chem_species_t,
            arrinfo_t<real_t>
        > ambient_chem,
    );

    void step_async(
        const opts_t<real_t> &
    );

    // diagnostic methods
    // ...
    void diag_chem(const enum chem_species_t&);
    // ...

```