MgO, $Al_2O_3$, and CaO, nanosized particles, are promising potential reactive sorbent materials due to to their high surface area, strong adsorbability, and potential reactivity toward CWAs. Those NPs remove the agent rapidly from the contaminated surfaces, degrade them in situ, and hence render them nontoxic (52). If degradation may present clear benefits, we must be careful with their use on skin (53). Nanosized particles of MgO, $Al_2O_3$, and CaO, with at least one dimension reaching 100 nanometers or less have been developed for skin decontamination (54), but the regulation of NPs has to be considered with respect to the rules for health (55).

#### 24.6.4.2 Magnesium Oxide Nanoparticles

Single metallic oxide, MgO, nanocrystals are highly reactive and adsorb, neutralize, and degrade chemical agents. MgO nanoparticles with sizes ranging from 10 to 30 nm have been incorporated in a polyvalent device DEC'POL.

Whereas nanosized particles of MgO are not recommended for a cutaneous application, incorporated in the structure of a "superabsorbent material," the DEC'POL device is proposed for skin decontamination by transfer, neutralization, and degradation due to its active material (56).

#### 24.6.4.3 Cerium Oxide Water Formulation

Cerium oxide, $CeO_2$, is known for its biomedical application as a reactive sorbent for the degradation of nerve agents (57) and organophosphates such as parathion and chlorpyrifos in solvent media (heptane, acetonitrile) under ambient conditions. The formulation of NPs with thickening aqueous dispersions of $CeO_2$ were tested for skin decontamination with encouraging results (49, 50).

#### 24.6.4.4 Dermal Decon Gel

Dermal Decon (DD) gel is a formulation created after advances in knowledge in chemical partition binding to stratum corneum proteins, lipids, and hydration effects (2625). DD gel, a rapidly drying gel with a peel-off film, is prepared with ingredients such as carboxy methyl cellulose for its water capacity adsorption, Lutrol for binding chemical properties, Kollidon SR for binding and absorption for polar and nonpolar compounds, and FE as an adsorbing agent. Decontamination efficiency has been compared to several decontaminants (58). The main advantages are that massage is unnecessary, and additional cleanup is unnecessary compared to the Reactive Skin Decontamination Lotion (RSDL). DD gel has been comparaed on hairy and nonhairy skin after 30 minutes dermal exposure to paraoxon (an organophosphorous pesticide). DD gel is proposed for absorbance, binding, extraction, and detoxification in skin decontamination. Acute toxicity has not been studied, but its components are used in pharmaceutical or cosmeceutical industries or as decontaminating absorbance with no or low toxicity (59).

### 24.6.5 Suspensions and Emulsions

#### 24.6.5.1 Suspensions

Succesful decontamination of FE suspension, enabling a dramatic reduction of skin contamination after a brief exposure scenario, appears to be rapid and reliable and should be formulated in a new device ready to use for self-decontamination (27).

#### 24.6.5.2 Pickering Emulsions

Pickering emulsions, i.e. solid-stabilized emulsions, containing silica (S-PE) or Fuller earth (FE-PE), with the determination based on the high specific surface area (63).

### 24.6.6 Washing

#### 24.6.6.1 Water

Water decontamination is largely used in mass decontamination and has optionally added detergents or bleach solutions. Wash and rinse may be set up quickly and rinse a large part of the involved