providing an ion exchange medium to a treatment vessel, the ion exchange medium comprising sodium titanate synthesized by:

providing at least one source of titanium that includes nano-crystalline titanium having a mean primary crystallite diameter of 1 nm to 30 nm;

providing at least one source of sodium oxide;

forming a reaction mixture that includes the at least one source of titanium and the at least one source of sodium oxide in a suitable solvent; and

reacting the components of the reaction mixture to produce a reaction product that includes sodium titanate having a particle size ranging from 1 micron to 100 microns;

providing water from a water source to the treatment vessel; and

passing the water through the sodium titanate ion exchange medium in the treatment vessel to remove at least one contaminant.

15. The method of claim 14, wherein the nano-crystalline titanium is a titanium oxide or a titanium hydroxide.

16. The method of claim 15, wherein the nano-crystalline titanium is titanium dioxide.

17. The method of claim 14, wherein the sodium titanate has an average particle size from 20 microns to 70 microns.

18. The method of claim 14, wherein the sodium titanate has a surface area of at least 200m^2/g.

19. The method of claim 14, wherein the at least one contaminant comprises a metal.

20. The method of claim 14, wherein the metal is lead.

~~21. The method of any one of claims 1 and 14, wherein the at least one source of sodium oxide includes sodium hydroxide (NaOH) and Sodium Silicate (Na_2SiO_3), and the sodium titanate is synthesized in accordance with the following reaction formula:~~

~~$2\ TiO_2 + 2\ NaOH + Na_2SiO_3 = 2\ Na_2TiO_3 + H_2O + SiO_2$.~~

22. The method of claim 14, wherein the step of providing an ion exchange medium to a treatment vessel further comprises steps of:

adding sodium silicate to the reaction product; and

forming an ion exchange product comprising from about 20 wt% to about 90 wt% sodium titanate, from about 0 wt% to about 60 wt% sodium hydroxide, from about 0 wt% to about 20 wt% sodium silicate, from about 0 wt% to about 10 wt% sodium sulfate, and from about 5 wt% to about 10 wt% water.