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**Sunkara et al.**

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(54) **METHODS FOR SYNTHESIZING METAL OXIDE NANOWIRES**

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(58) **Field of Classification Search**  
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USPC ..... 423/598, 610, 609, 594.19, 605  
See application file for complete search history.

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(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 916 days.

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(Continued)

(57) **ABSTRACT**

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A method of synthesizing a metal oxide nanowire includes the steps of: combining an amount of a transition metal or a transition metal oxide with an amount of an alkali metal compound to produce a mixture; activating a plasma discharge reactor to create a plasma discharge; exposing the mixture to the plasma discharge for a first predetermined time period such that transition metal oxide nanowires are formed; contacting the transition metal oxide nanowires with an acid solution such that an alkali metal ion is exchanged for a hydrogen ion on each of the transition metal oxide nanowires; and exposing the transition metal oxide nanowires to the plasma discharge for a second predetermined time period to thermally anneal the transition metal oxide nanowires. Transition metal oxide nanowires produced using the synthesis methods described herein are also provided.

**15 Claims, 16 Drawing Sheets**

