

(12) 按照专利合作条约所公布的国际申请

(19) 世界知识产权组织
国际局



(43) 国际公布日:
2003年2月13日(13.02.2003)

PCT

(10) 国际公布号:
WO 03/011761 A1

(51) 国际分类号: C01G 1/00

(21) 国际申请号: PCT/CN02/00521

(22) 国际申请日: 2002年7月26日(26.07.2002)

(25) 申请语言: 中文

(26) 公布语言: 中文

(30) 优先权:
01127978.8 2001年7月27日(27.07.2001) CN

(71) 申请人(对除美国以外的所有指定国): 鞍山科技大学
(ANSHAN UNIVERSITY OF SCIENCE AND
TECHNOLOGY) [CN/CN]; 中国辽宁省鞍山市南中
华路49号, Liaoning 114002 (CN)。

(72) 发明人:及

(75) 发明人/申请人(仅对美国): 周英彦(ZHOU, Yingyan)
[CN/CN]; 高首山(GAO, Shoushan) [CN/CN]; 王开明
(WANG, Kaiming) [CN/CN]; 温传庚(WEN,
Chuangeng) [CN/CN]; 李晓奇(LI, Xiaoqi) [CN/CN];
中国辽宁省鞍山市南中华路49号, Liaoning 114002
(CN)。

(74) 代理人: 中科专利商标代理有限责任公司(CHINA
SCIENCE PATENT & TRADEMARK AGENT

LTD); 中国北京市海淀区海淀路80号中科大厦16层,
Beijing 100080 (CN)。

(81) 指定国(国家): AE, AG, AL, AM, AT, AU, AZ, BA,
BB, BG, BR, BY, BZ, CA, CH, CO, CR, CU, CZ, DE,
DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM,
HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ,
LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK,
MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO,
RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT,
TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW

(84) 指定国(地区): ARIPO专利(GH, GM, KE, LS, MW,
MZ, SD, SL, SZ, TZ, UG, ZM, ZW), 欧亚专利(AM,
AZ, BY, KG, KZ, MD, RU, TJ, TM), 欧洲专利(AT,
BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB,
GR, IE, IT, LU, MC, NL, PT, SE, SK, TR),
OAPI专利(BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG)

本国际公布:

— 包括国际检索报告。

所引用双字母代码和其它缩写符号, 请参考刊登在每期
PCT公报期刊起始的“代码及缩写符号简要说明”。

(54) Title: A PROCESS FOR PRODUCING NANO-POWDERS AND POWDERS OF NANO-PARTICLE LOOSE
AGGREGATE

(54) 发明名称: 纳米粉末及纳米粒子疏松聚集体粉末的制备方法

(57) Abstract: The present invention discloses a process for producing nano-powders and powders of nano-particle loose aggregate, which comprises: (a) providing at least two reactant solutions A and B capable of rapidly reacting to form deposits; (b) supplying the at least two solutions A and B at least at the reaction temperature into a mixing and reaction precipitator respectively, in which mixing reaction and precipitation are continuously carried out in sequence, the said mixing and reaction precipitator being selected from at least one of a tubular ejector mixing reactor, a tubular static mixing reactor and an atomizing mixing reactor; and (c) treating the deposit-containing slurry continuously discharged from the mixing reaction precipitator. The process makes it possible to control the size of the nano-particles, produces particles uniform in size, good in dispersibility and high in yield, while being simple and saving energy. The process can be used to produce nano-powders of nano-particle aggregates of various kind of metals, oxides, hydroxides, salts, phosphor compounds, sulphur compounds, organic compounds, and inorganic organic compounds.

(57) 摘要

本发明公开了一种纳米粉末及纳米粒子疏松聚集体粉末的制备方法, 包括以下步骤: (a) 提供能快速反应生成沉淀的至少 A、B 两种反应溶液; (b) 将至少 A、B 两种反应溶液于至少反应温度下分别送入混合反应沉淀器, 在其中连续有序混合、反应和沉淀, 所述混合反应沉淀器选自管式喷射混合反应器、管式静态混合反应器和雾化混合反应器中的至少一种; (c) 将从混合反应沉淀器连续流出的含沉淀浆料进行处理。该方法能使纳米粒子的粒径大小可调控, 粒度均匀、分散性好, 产量高、工艺设备简单、消耗少。用该方法可生产各种金属、氧化物、氢氧化物、盐、磷族和硫族化合物、有机化合物、无机有机化合物纳米粉末及纳米粒子聚集体粉末。