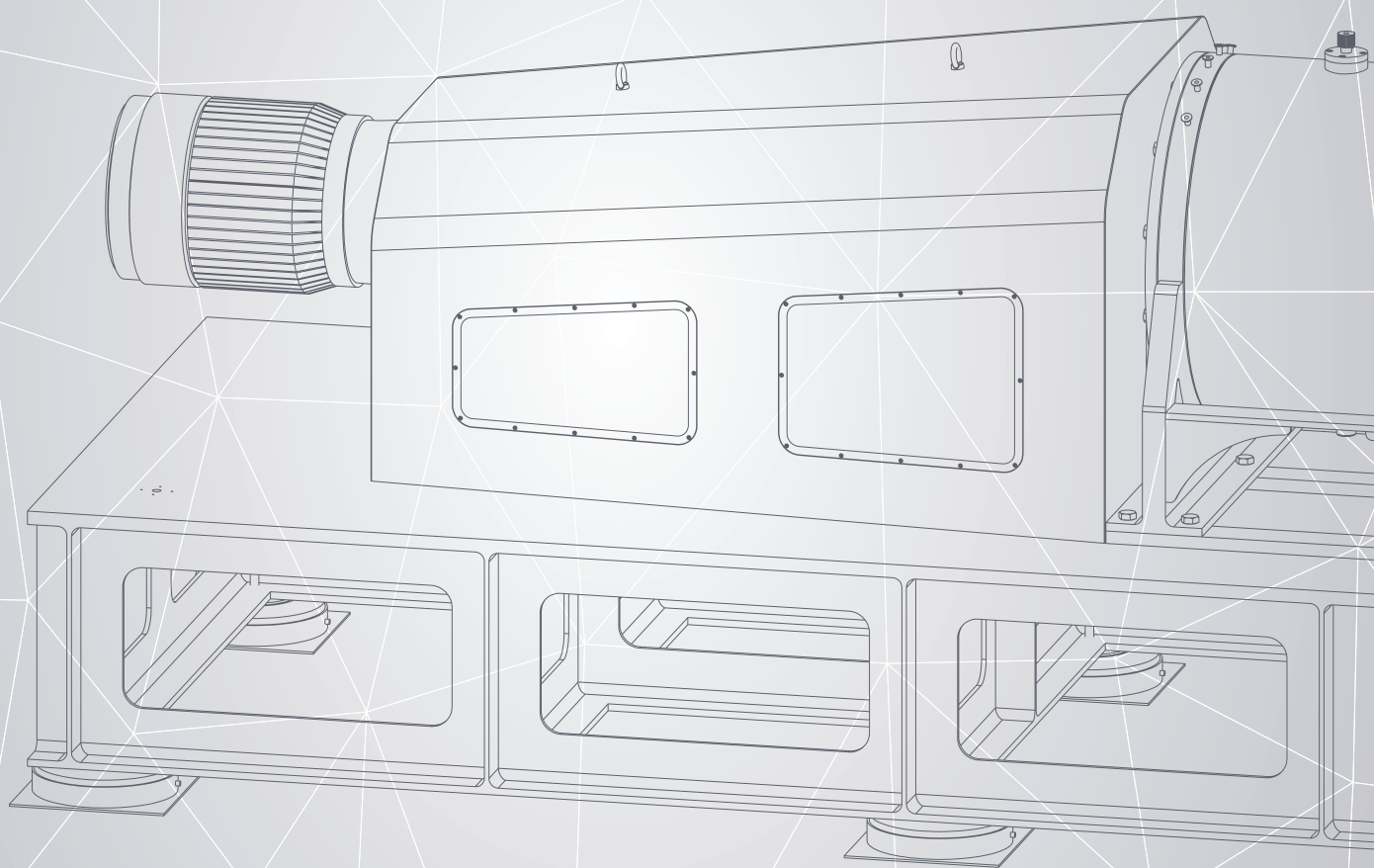


Laminar Continuous Taylor Reactors

Applications



Graphene



Food & Beverage



Nano material



Recycling



Pharmaceutical



Petro chemical



Fine chemical



Battery

Manufactured by



Laminar

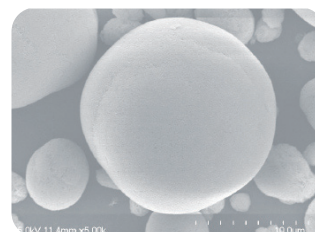
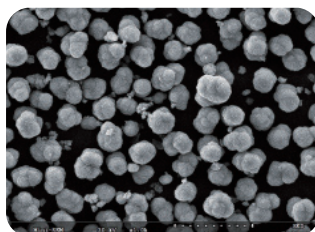
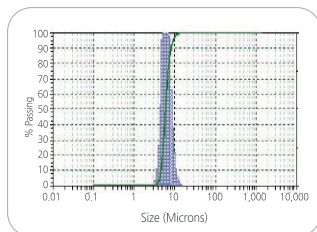
Distributed in the UK & Ireland by Analytik

Co-Precipitation

Li - Battery

(NiMnCo)(OH)₂

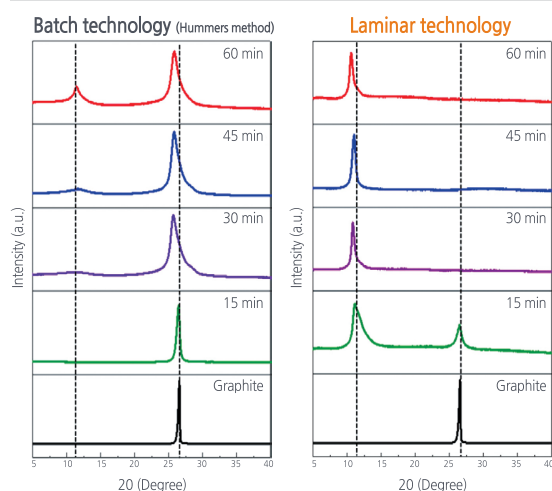
Division	Conventional System	Laminar Reactor
Reaction Time (h)	10	3
Particle Size (μm)	5~20	1~20
Span ([D ₉₀ -D ₁₀]/D ₅₀)	0.5	0.2
Tap Density (g/mL)	2.1	2.2



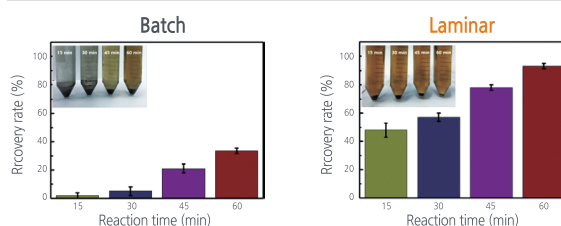
Exfoliation

Graphene Oxide

XRD Patterns



Recovery rate



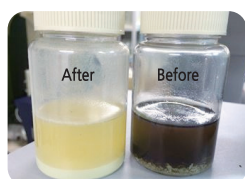
Comparison Table

Division	Conventional System	Laminar Reactor
Production process	Batch	Continuous
Process Temp. (°C)	30	20
Recovery Rate (%)	70	95 ↑
Reaction Time (h)	Max 120	1 ↓
Production Cost (USD/g)	500	50

Purification

OLED

Division	Conventional system	Laminar Reactor
Purity (%)	99.99	99.99
Manufacturing method	Batch	Continuous
Process temp. (C)	Max 650	20~80
Process pressure (Torr)	10 ² ~10 ⁶	Atmosphere
Purification time	12~24	1
Improvement of OLED life time (%)	-	13-20%



TPPA

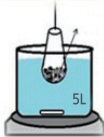
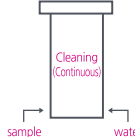
Division (ppm)	Raw Material	Laminar Reactor	Recovery Rate (%)
Na	162,675	2,610	98.40
Mg	6,083	683	88.76
Al	774	37	95.16
K	997,767	8,907	99.11
Ca	4,010	1,689	57.88
Fe	1,710	661	61.31

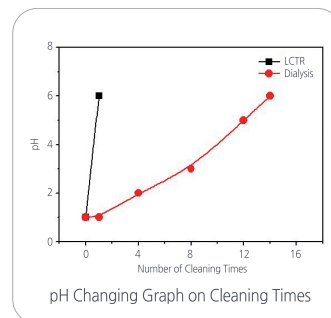
Tryptophan

Division	Batch	Laminar Reactor
Recovery rate (%)	60	75
Purity (%)	95	98
Particle size (μm)	30	50 ↑

Surface Treatment

Carbon Material

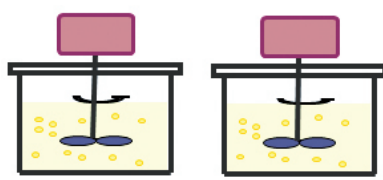
Division	Dialysis Process	Laminar Reactor
Diagram		
Processing Time (h)	168	1.66
Consumption of water (L)	70	4
Production Process	Batch	Continuous
pH values after washing	6	6



- * Saving the processing time by 99%
- * Reduce the consumption of water by 94.2%


Crystallization

Mn₃O₄




[Step 1] [Step 2]

Step 1 : $\text{Mn}^{2+} + 2\text{NaOH} \rightarrow \text{Mn(OH)}_2$
 Step 2 : $3\text{Mn(OH)}_2 + 2\text{O}_2 \rightarrow \text{Mn}_3\text{O}_4$



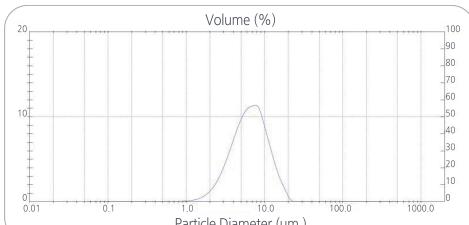
Reducing
one of the two step



Taylor reactor

Step 1 : $3\text{Mn}^{2+} + 6\text{NaOH} + 2\text{O}_2 \rightarrow \text{Mn}_3\text{O}_4$

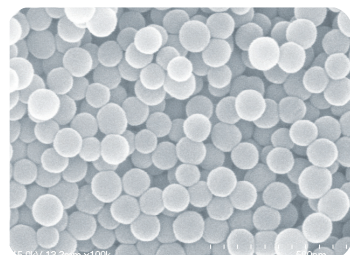
Metal Powder



Division	Conventional System	Laminar Reactor
Production Process	Batch	Continuous
Particle Size (μm)	70.93	7.19
Span ($(D_{90} - D_{10}) / D_{50}$)	3.418	1.726
Reaction Time (h)	2	0.6

Sol-Gel

SiO₂ / Nano

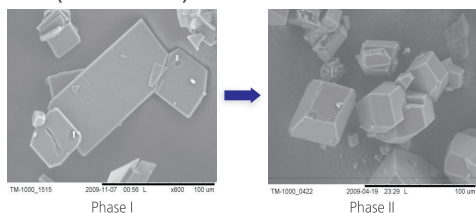


Temperature (°C)	40
Agitation speed (rpm)	600
Reaction time (min)	30
Develop process	Continuous Reactor

It was impossible to produce uniform particle due to the delay time on nucleation. Nucleation and crystal growth occurs in each reactor.

Phase Transformation / Pharmaceutical

SMZ (Sulfameraine)



Division	Conventional System	Laminar Reactor
Reaction Time (h)	100	4
Agitation speed (rpm)	3000	900
Process Temp. (°C)	10	10
Phase Transformation	Impossible	Possible

Isomer separation / Petrochemical

DMT(Dimethyl Terephthalate) - Melt Crystallization

Division	Melting point(°C)	Boiling point (°C)	Purity (%)
MFB (Methyl-P-formylbenzoate)	59~63	265	52.8
DMT (Dimethyl Terephthalate)	142	288	45.0



Division	Conventional System	Laminar Reactor
Raw Material	45.0	
1 Times	67.4	98.2
2 Times	92.4	-

Paper

- Emulsion polymerisation (Kataoka et al., 1995; Wei et al., 2000)
- Catalytic (Cohen and Maron, 1990)
- Photochemical (Haim and Pismen, 1994; Forney and Pierson, 2003)
- Electrochemical (Coeuret and Legrand, 1981)
- Enzymatic reactions (Iosilevskii et al., 1993; Giordano et al., 2000b)
- Cell cultivation (Haut et al., 2003)
- Precipitation (Jung et al., 2000; Judat et al., 2004)
- Flocculation for wastewater treatment (Grohmann et al., 1981)
- Dynamic tangential and membrane filtration (Schwille et al., 2002; Lee and Lueptow, 2004)
- Microparticle classification (Ohmura et al., 2005)
- Liquid—liquid extraction (Baier et al., 2000; Forney et al., 2002)
- Exfoliation (Woo Seok Yang, 2015, Carbon)

**For more information, or to discuss your requirements,
please contact us on 01954 232 776**

For more information, please contact:

analytik (UK and Ireland Distributor)

2 Cygnus Business Park, Middle Watch, Swavesey, Cambridge, CB24 4AA

T: +44 (0)1954 232 776 **E:** info@analytik.co.uk **W:** analytik.co.uk

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