

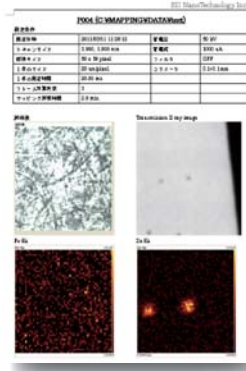
## Most Convenient Functions

### Mapping Contaminant Report

System creates mapping reports of contaminants automatically



Mapping Measure Conditions  
X-ray transmission images  
Microscopic images  
Fluorescent X-ray mapping image  
Spectral charts



### Contaminant Report

Contaminant detected automatically from X-ray transmission image is displayed as a contaminant report



Contaminant XY coordinates  
Size of contaminants  
Element identification

検出レポート	位置 X(mm)	位置 Y(mm)	サイズ X(μm)	サイズ Y(μm)	サイズ (μm)	成分
P001	430.128	197.089	13	13	132	Ca
P002	430.859	195.201	45	38	1181	Cr,Fe,Ni
P003	431.292	194.502	22	26	233	Cr,Fe,Ni
P004	490.2	190.241	32	32	355	Cr
P005	483.16	187.016	45	38	1140	Cr,Fe,Ni
P006	484.221	193.047	45	45	1425	Ti
P007	490.811	186.632	26	32	892	Cr
P008	491.791	186.064	32	32	274	Fe
P009	514.691	200.375	19	19	205	Ca

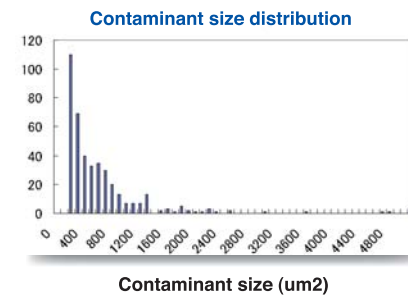
### Contaminant Size

Automatically calculates shadow area of contaminants from X-ray transmission image and finds approximate size



### Particle Distribution

Number distribution is displayed for the contaminant size found from the contaminant size measurement function for each particle diameter.



## Dimensions · Weight

Unit Name	W (mm)	D(mm)	H(mm)	W(kg)
Instrument	1340	1000	1550	650
PC	187	432	411	—
Display	410	182	363 ~ 493	6

## Main Specifications

Measurement Elements	Al (13) ~ U (92)
Sample Status	Solid and Powder
Max. Sample Size	W 250mm x D 200mm
Max. Sample Weight	1kg
Source	Water cooled X-ray tube (for transmission), Air cooled X-ray tube (for fluorescent X-rays)
Detector (fluorescence)	Vortex Semiconductor detector (No liquid nitrogen)
Controller	Desktop PC & 19" LCD 2 units
Automatic contaminant analysis function	Automatic element ID from contaminant detection by X-ray transmission image
Contaminant size measurement function	Auto calc of contaminant size (shadow area) from X-ray transmission image
Safety Mechanism	Sample door interlock, Sample crash protection function
Power specification	AC200V ~ 240±10% Single Phase 20A
Options	Signal Tower, Cooling Water Circulation Device, Additional Monitor

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## EA8000

Challenging Common Notions about Contaminant Analysis

Hybrid Inspection by a unique combination of X-ray transmission and fluorescent X-ray technology.

A unique solution for Contaminants Inspection and Analysis



Hitachi High-Tech Science Corporation



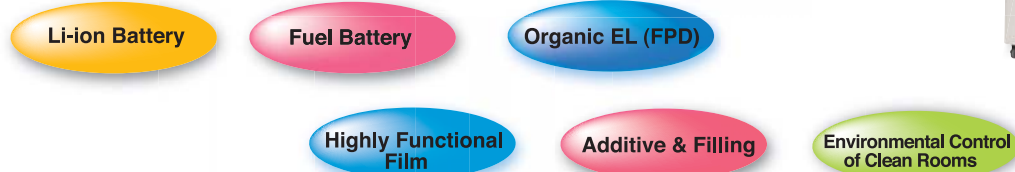
# EA8000 X-ray Particle Contaminant Analyzer

## Contributes to:

- Improved yields and a high efficiency LIB production process
- Contaminant monitoring system established in process control
- Contaminant control by process improvement



## Typical Applications of Contaminant Inspection and Analysis



## Features

- EA8000 has equipped with both the X-ray transmission device and the XRF device.
- The high-resolution X-ray transmission achieves high speed and sensitive contaminant analysis for high density X-ray irradiation at microscopic areas.
- Newly developed XRF polycapillary optics enable X-ray irradiation at microscopic areas.

20 $\mu$ m sized metal contaminants in an A-4 size sample are detected and inspected in less than 30 minutes then elemental analysis is conducted by XRF without moving sample, resulting in high throughput analysis.

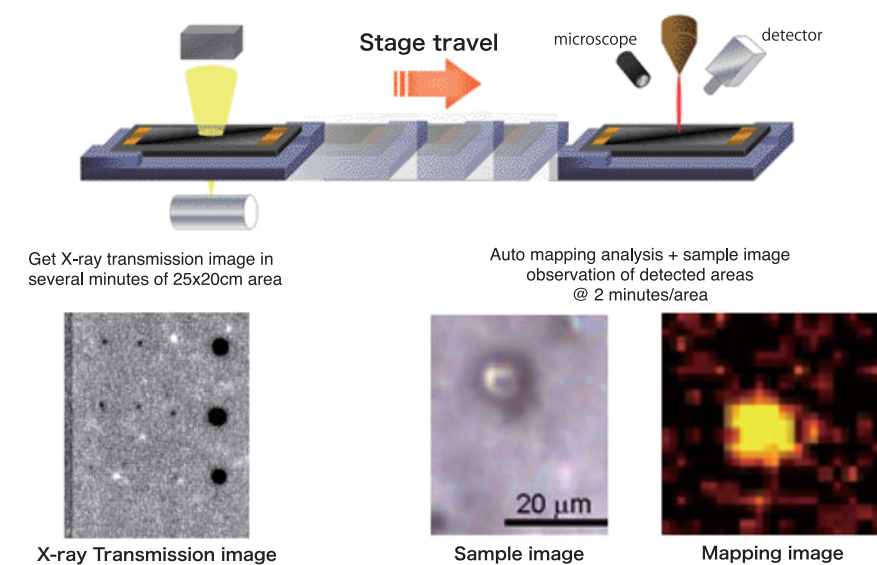


## Operation with work efficiency in mind

- Fully automated flow from "Image," "Detection," "Observation," "Identification," to "Reporting"

Fully automated inspection starts just after setting the sample and selecting a recipe.

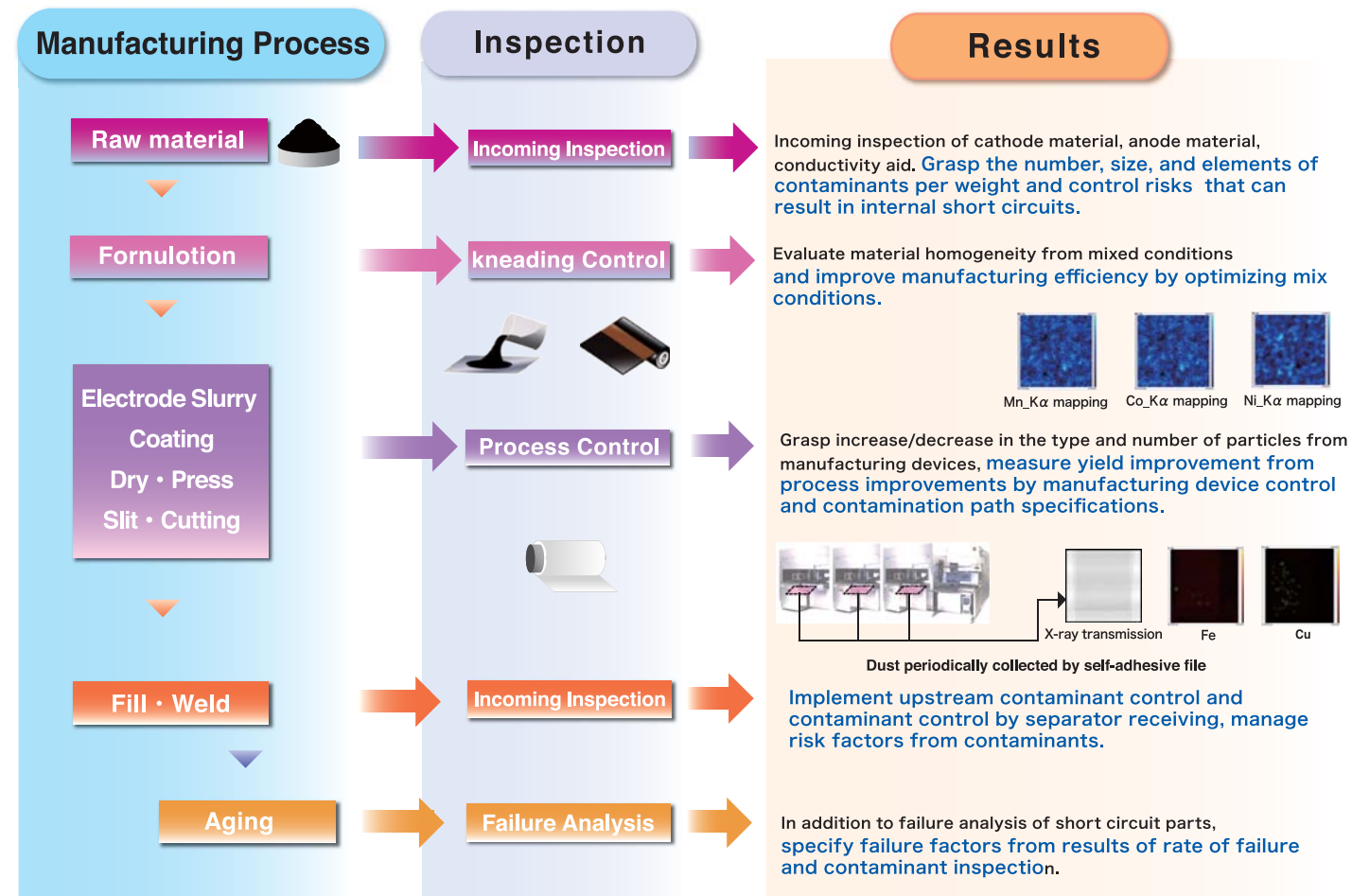
- Get X-ray transmission image → Contaminants detection
- Fluorescent X-ray analysis → Contaminant element identification



### Contaminant Inspection Procedure by EA8000

- Fully Automated Flow**
- Set sample and select contaminant inspection recipe
  - Get X-ray transmission image
  - Auto detect contaminant by image processing
  - Shape observation & image capture of detected area by microscope (with auto focus function)
  - Element mapping analysis of detected spot by fluorescent X-rays
  - Contaminant & Mapping Analysis Report Auto Create (size, number, coordinates, element info, etc.)

## Examples of lithium ion battery applications



### Incoming Inspection conductivity additives, anode material

About 15g of organic and inorganic powder is put in a plastic bag and set in the instrument for contaminant inspection. Contaminant inspection and element identification are performed in several minutes.

### Example of measuring conductive additive



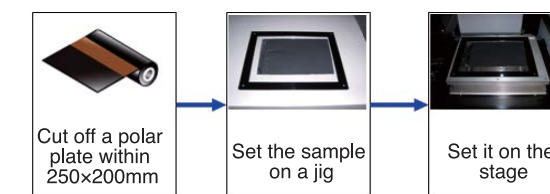
### Detected contaminants



### Process Control cathode plate, anode plate

Contaminant inspection and element identification are performed in several minutes to several tens of minutes.

### Example of measuring anode plate



### Detected contaminants

