COMET Inc.
Startup company from NIMS, the leading Institute of Materials Science

High throughput screening business for new materials discovery and their applications

CEO: Dr. Kenichiro Takahashi
Research Engineer: Dr. Toyohiro Chikyow
Present business of COMET Inc.

- New materials discovery service by high throughput experimentations
  examples: thermoelectric, ferroelectric battery catalysis etc.

- Sales of combinatorial sputtering system
  (6 guns are set in the deposition chamber)

- Supply of GaN on Si wafer for LED and power devices
Established: Dec, 26th in 2007
Office: 5-9-5 Tokodai, Tsukuba
Ibaraki 300-2635 Japan
Capital Stock: 72,980,000 Yen

About the COMET Inc

Steering Members
Director:
Masayoshi Shimizu (MBA)
Setsu Suzuki
Keiji Ishibashi

Engineering Division
CTO: Dr. Keiji Ishibashi
Senior Engineer: Dr. Kisei Ri
Research Engineer: Dr. Toyohiro Chikyow
Materials innovation is the key to realize sustainable society

Super low power device and long life battery

Wind generator With super magnet

Solar panel

Fuel cell in house

Motor with new magnet

Thermoelectric materials

New battery system

Light weighted steel
New Materials Innovation in nano device

“Innovation” is driven by “new materials”!
Basic Research Center (IBM Watson, Bell Lab.)

R&D division

Production line

Old Business Model

Present R&D Model

Materials Research

University

Venture

Nat. Institutes

Technology gap

R&D (complicated and compromise)

COMET Business, bridging seeds and application

Production
Reference 1: two ways for new materials discovery

Deductive way

Induction

Results

Synthesis

Design

Calculation simulation

Data science

Measurements

Experiments

Database

Data accumulation

synthesis

experiment
Modern process for New Materials Discovery

Idea of Materials

Virtual screening by Machine Learning
Deep Learning ( >10,000)

Real Screening by high throughput synthesis and measurement

Storage as the data base

New Materials Discoverd
Vertial Screening for data: Materials Informatics

① Design of Materials

② Vertical Screening (≥10,000)

Enough data set

Proper Discriptor

Materials Screening by MI

Super Computer

Data Base

Text data mining
Multi-targets Combinatorial Sputtering system

Appealing points:
- Full automated
- Ternary alloying in the same thickness
- 4 inch wafer is available.
- More than 10 equipment were shipped.

① GUI for every users
② automatic recording (date, condition, materials)
③ connection to Internet (Internet of things: IoT)
Automatic ternary alloying by combinatorial method

Composition spread

Combinatorial Sputtering system by COMET Inc.

Repeat these synthesis process until getting the desired film thickness
Summary

- New approach to materials science supported by machine learning or AI is proposed and it becomes the main stream.

- High throughput experimentation is inevitable to make “virtual screening” to “Real screening”

**COMET Inc.**

*The “state of the art” thin film combinatorial high-throughput development*