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Corporate Profile

Address 11 Tsutsumisoto-cho Kisshoin Minami-ku, 601-8399 Kyoto, JAPAN
TEL: 075-314-8760
FAX: 075-314-4167

Establishment 1954/02
Capital 1,0000000 JPY
CEO Kazuo KAWATA
Employees 184 (2020/01)
Main site Head Office (Kyoto), Fukuchiyama plants (2 plants), Suzhou plant
Representative office Tokyo, Osaka, Sendai, Fukuoka, Nagoya
Branch Suzhou (China), Seoul (Korea)
Member organization Japan Industrial Association of Gas and Kerosene Appliances (JGKA)
Kyoto Chamber of commerce

Corporate philosophy
At FKK we are constantly thinking about how to contribute to today’s environmental challenges via solutions and systems to save energy. We are constantly looking for innovative and smarter solutions and achieve our goal through customer's satisfaction. We are building harmony between people, foster a supportive and dynamic workplace, and deal sincerely with all tasks and people we encounter. We achieve this through strong principles to ensure a permanent and responsible prosperity, considering human, human development and its relation with environment as the center of our business strategy.

Environment
In a world where our natural environment is a bit more threatened every day, FKK have always been committed to nature. Considering the environmental protection as an essential purpose, in compliance with environmental standards (ISO 14001, REACH and RoHS) FKK designs and develops solutions that are more respectful of nature.

Quality
FKK gain the satisfaction and trust of the customer by drawing on unique technology and skills. We take customer’s point of view all the time and constantly improving customer satisfaction, responsiveness and the ability to take prompt and effective action. FKK put the quality management system (ISO 9001) to effective use and constantly improve the quality of products and services.

History
1954.02: Foundation of Fuji Kogyo in Kyoto, Japan
1957.02: Production of spark plug for agricultural machinery
1970.02: First production of igniters for oil burner
1985.02: The headquarter moved to Kisshoin, Kawata Genjiro becomes president of the group
1988.04: New factory built in Fukuchiyama
2003.02: Establishment of Shanghai subsidiary
2005.05: Obtained ISO 9001 certification
2010.02: New plant in Fukuchiyama
2011.07: Production of igniters and busbar for fuel cell appliances. International development start
2012.08: Partnership bind in UK, Belgium and Russia
2013.01: Fukuchiyama ignition electrode plant is automated
2014.07: Foundation of Suzhou FKK Corporation
2015.07: TUV certification of all biomass alumina ceramic igniter products
2019.10: PSx series ceramic igniter for biomass and wood pellet reached a cumulated sales of 1M pcs.
Starting international development in 2011, FKK is nowadays present in Europe and Asia and exporting products worldwide on all continents.
To the essence of heat

Ignition components are essential in the design of heating application and burner. Seek efficiency in ignition is our job revolutionize industry is our goal.

<table>
<thead>
<tr>
<th>Product type</th>
<th>Ignition Electrode</th>
<th>Ignition electrode Assembly</th>
<th>Ionization prob and flame sensor rod</th>
<th>Ionization rod with fitting</th>
<th>Spark rod</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials</td>
<td>Alumina 90–99.9%</td>
<td>Alumina 90–99.9%</td>
<td>Alumina 90–99.9%</td>
<td>Alumina 90–99.9%</td>
<td>Alumina 90–99.9%</td>
</tr>
<tr>
<td></td>
<td>Kanthal, Hitachy SYTT, Stainless steel, Steel</td>
<td>Kanthal, Hitachy SYTT, Stainless steel, Steel</td>
<td>Kanthal, Hitachy SYTT, Stainless steel, Steel</td>
<td>Kanthal, Hitachy SYTT, Stainless steel, Steel</td>
<td>Kanthal, Hitachy SYTT, Stainless steel, Steel</td>
</tr>
<tr>
<td></td>
<td>All connector available</td>
<td>All connector and fitting available</td>
<td>All connector and fitting available</td>
<td>All connector and fitting available</td>
<td>All connector and fitting available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Application</th>
<th>Cooktop/water heater</th>
<th>Water heater</th>
<th>Cooktop/Burner</th>
<th>Burner</th>
<th>Industrial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Possible size (mm)</td>
<td>All lengths possible from 30 to 1800 mm, all electrode diameters possible</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range of temperature</td>
<td>600 to 1400 °C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Image
<table>
<thead>
<tr>
<th>Product type</th>
<th>Hot Surface Igniter (plate type)</th>
<th>Hot Surface Igniter (rod type)</th>
<th>Planar heater</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Silicone Nitride</strong></td>
<td>Igniter 1000~1200°C</td>
<td>Biomass pellet /log/chips/coal igniter 300W</td>
<td>Alumina heater for molding press</td>
</tr>
<tr>
<td><strong>Silicone Nitride</strong></td>
<td>Igniter 1200~1400°C</td>
<td>Biomass pellet /log/chips/coal igniter 240W</td>
<td></td>
</tr>
<tr>
<td><strong>Materials</strong></td>
<td>Silicone Nitride Flange Alumina 90~99.9% All connector and fitting available</td>
<td>Metalized Alumina 92% Flange Alumina 90~99.9% All connector and fitting available</td>
<td>Alumina 90~99.9% All connector and fitting available</td>
</tr>
<tr>
<td><strong>Application</strong></td>
<td>Boiler/Burner</td>
<td>Burner/Gas Reformer</td>
<td>Stove/Boiler/Burner</td>
</tr>
<tr>
<td><strong>Features</strong></td>
<td>High speed 6s to 1000 °C 1200~1350 °C</td>
<td>High temperature 90000 hrs at 1350 °C</td>
<td>High temperature and long rated life 100/120/220~240V</td>
</tr>
<tr>
<td><strong>Range of temperature</strong></td>
<td>1000~1200 °C</td>
<td>1200~1350 °C</td>
<td>970~1050 °C</td>
</tr>
<tr>
<td><strong>Image</strong></td>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
<td><img src="image3.png" alt="Image" /></td>
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<tr>
<td><strong>Special order</strong></td>
<td>OK</td>
<td>OK</td>
<td>OK</td>
</tr>
</tbody>
</table>
Every day in Asia, Europe or America, FKK is present in the lives of millions of people around the world through boilers, water heaters and stoves components.

In Japan, FKK Corporation has led the way in designing and manufacturing high quality components for over 60 years.

Today, FKK Corporation with its new assembly line offers engineering solutions for production of divers ignition components for gas, oil wood as well as Fuel cell and other renewable energy appliance ignition and heat detection systems.

If your application requires an electrode or sensing rod, we can provide one of our model or design it and produce it for you.

### Products

|---------------------|------------------|-------------------|----------------------|----------------------|------------------------------------------|----------------------|--------------------|----------------------|------------------------|-------------------|-------------------|----------------|------------|--------------------------|-------------------|----------------|

### Application

<table>
<thead>
<tr>
<th>Gas</th>
<th>Furnace/burner heating equipment</th>
<th>Boiler</th>
<th>Table stove</th>
<th>Table top burner</th>
<th>Commercial kitchen equipment</th>
<th>Industrial heating Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil</td>
<td>Oil hot water equipment</td>
<td>Heating equipment</td>
<td>Portable stove</td>
<td>Furnace/burner</td>
<td>Fan heater</td>
<td>Boat and small aircraft engines (ignition plug)</td>
</tr>
<tr>
<td>Renewable energy</td>
<td>Pellet stove/boiler/burner igniter</td>
<td>Stirling engine igniter</td>
<td>MCHP Fuel Cell SOFC/PEFC burner igniter</td>
<td>Fuel Cell reformer component</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A part of standard production is fully automated. Automation has been implemented to increase quality while reducing cost for customers. Workers can now concentrate on increasing tailor made products quality.

**Production process**

**Insulation tester**

All ceramic bodies are tested before the beginning of the production. Robot applies 15KV for a few seconds inside the ceramic body.

**Cropping machine**

Karthal, SYTT Hitachi Metal, FCHW made electrode are cropped automatically.

**Ceramic sealant bonder**

Robot seals the electrode and ceramic insulator with FKK Corporation made ceramic compound.

**Oven and trail**

After sealing process, the trail goes to oven to solidify the sealant.

**Bending machine**

Bending machine performs the bending of the electrode from 1 to 4 bending points.
Ignition and sensing electrodes

Ignition electrodes and flame sensor rods

Ignition electrodes used for the ignition and temperature control in gas and oil combustion equipment, work on the principle of ignition by high voltage flashover.

FKK Corporation ignition electrodes, flame sensor rods and assemblies come in over infinite configurations.

If your application requires an electrode or sensing rod, we can provide one of our model or design it and produce it for you.

**Application**

<table>
<thead>
<tr>
<th>Gas</th>
<th>Oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas boiler / water heating equipment</td>
<td>Oil hot water equipment</td>
</tr>
<tr>
<td>Furnace/burner heating equipment</td>
<td>Heating equipment</td>
</tr>
<tr>
<td>Table stove / Table top burner</td>
<td>Portable stove</td>
</tr>
<tr>
<td>Commercial kitchen equipment</td>
<td>Furnace/burner</td>
</tr>
<tr>
<td>Commercial burner</td>
<td>Industrial burner equipment</td>
</tr>
</tbody>
</table>

**Specification**

- Insulator material available: Mullite, Steatite, Heat Resistant Resin, Alumina 90~99.6%
- Electrode material available: Kanthal A, C, D, Hitachi Metals Ltd. YSS-SYTT, PYROMAX, FCHW1/FCHW2, SUS304/310/316, Inconel, Various Ni-Cr alloy wire
- Wiring and connector available: all type
- Ceramic insulator size available: length 10 to 1800 mm, diameter 3 to 15mm
- Heat resistance range 700 to 1400°C
Overview of ignition and sensing electrodes

Examples of industrial ignition and sensing rods

Unit (mm)

All sizes available

- Ø3
- Ø10 or Ø11
- Ø3

- G1/2 or M16 x P1.0
- M18 x P1.5
- M20 x P2.5

- Ø6.4
- Ø10 or 11
- M14 or M18

- Ø22
- Ø26

- 65
- L=200~1300

All sizes available

- Ø10 or 11

- M14 or M18
**Ignition and sensing electrodes**

Ignition electrodes and flame sensor rods product range overview

**Line up**

- **Simple electrode**
  - All dimensions available
  - All sizes available

- **Sensing / ionization electrode**
  - All kinds of flanges
  - All dimensions available
  - All sizes available

- **Electrode with flange**
  - All kinds of flanges

- **Threaded ignition / sensing electrode**
  - All sizes available

- **Electrode assembly**

**Overview of design**

- **Rod Electrode**
  - Ignition rod
  - All sizes available
  - All dimensions available

Unit (mm)
**M14 Spark Plug**

M14xP1.0 or P1.25

Electrode material
Ø3 SUS304
Ø3 SYTT
Ø2.9 Kanthal A1
Ø2.9 Kanthal DSD

**M18 Spark Plug**

M18xPT1/2

Electrode material
Ø3 SUS304
Ø3 SYTT
Ø2.9 Kanthal A1
Ø2.9 Kanthal DSD

**PT1/2 Spark Plug**

PT1/2 Spark plug with flame rod

Electrode material
Ø3 SUS304
Ø3 SYTT
Ø2.9 Kanthal A1
Ø2.9 Kanthal DSD
Introducing the PSx® series ceramic biomass igniters range, an advance in ignition technology for solid fuels.

FKK Corporation specialises in ceramic hot surface igniters and has many years of experience of working closely with customers to develop bespoke solutions for innovative appliances manufacturers. We are a trusted supplier of hot surface igniter products to many biomass/pellet stoves, burners and boilers manufacturers.

These advanced igniters are simply the best for lighting wood pellet and biomass burners. They use only a fraction of the energy required by hot air fans and ignition blowers and will light all fuel types. Ideal for wood pellets, wood chips, lot, corn, maize, etc.

With a considerably higher temperature, around twice that of traditional metal sheathed products, ignition times are reduced to as little as 60 seconds. This makes them significantly more economical in use.

All our range can be customized to fit perfectly in your appliance.

**Ceramic ignition technology benefits**

- A fraction of the energy consumption compared to conventional heater
- Long lasting (non aging)
- Time to ignition 60–90 seconds
- Tested to 100,000 cycles, used for long time in Japanese market (15 years)
- Easy to install and retrofit
- Fits any steel tube with an inner diameter of ≥18mm
- 1000°C at steady-state temperature
- Cannot overheat even with blower failure
- Available in 100V / 120V / 230V AC
- Fully electrically insulated with no exposed electric contacts
- UL/CE certified wiring (200 to 500°C heat resistant wire)
- Impervious to oxidation and corrosion
- Ignite wood pellet, wood chips, split logs, straw and other biomass
- Comply with RoHS, REACH regulation on Hazardous Substances

**Systems**

- Wood pellet stove
- Wood pellet boiler
- Wood pellet burner
- Wood chips burner
- Straw burner
- Other biomass burner

**Certification**

- TUV Rheinland - EN 60335
- TUV Rheinland - RoHS
A revolutionary way to ignite biomass

PSx series igniters revolutionize biomass heating appliances ignition process. FKK developed several types to fit in every appliances.

Tubular radiant structure type (Blowing air system: PSx-2 /PSx-7) ceramic igniters have a through hole that let air through the heating element body. With this structure, ignition performance can be increase by 1.4 times compare to metal cartridge heater.

Hermetic radiant structure type (PSx-1 / PSx-6) ceramic igniters heat the surround air for indirect ignition of pellet. These models are economical and more easy to install into airtight systems.

Rising surface temperature

Heat distribution

Nominal resistance: 44.64Ω
Inrush current: 5.05A (@240V/50Hz)
Current: 1.45A (@240V/50Hz)
PSx series igniters line up

A simple and efficient solution for biomass ignition

Application

Heaters suitable for ignition of biomass, wood pellet, wood chips, wood log, for stoves, boilers and burners.

Features

- Tested to 100,000 ON/OFF cycles.
- Fast ignition time (60–90s to ignite pellet according to burner)
- Wiring available in UL or CE certified version.
- Totally customizable solution, many design available
- 240W and 300W type
- Available in 100V, 120V, 230V

Line up

- **PSx-1**
  - 26mm ceramic flange
  - Hermetic radiant type

- **PSx-2**
  - 17.7 mm ceramic flange
  - Tubular structure type (Blowing air)

- **PSx-3/4**
  - No flange, perfect retrofit solution
  - Blowing air or radiant type available

- **PSx-6/7**
  - G3/8” threaded flange fixed on heater
  - Hermetic or Tubular structure type (Blowing air)

All drawings and data-sheets are available for download at: [www.plug.fkk-corporation.com/en/download](http://www.plug.fkk-corporation.com/en/download)
You can also scan the QR code to go directly on the related page.
This catalog is also available in BG, CN, CZ, DE, DK, ES, EN, FR, GR, IT, JP, KR, NL, PL, RU, SE language.
### Line up

300W Class - Black coating alumina heaters (B)

<table>
<thead>
<tr>
<th>Type</th>
<th>Reference</th>
<th>Flange type</th>
<th>Heater length (mm)</th>
<th>Available voltage (V)</th>
<th>Cable length (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>300W</td>
<td>PSx-1-240-B</td>
<td>Ceramic 26mm</td>
<td>107</td>
<td>230V</td>
<td>350mm</td>
</tr>
<tr>
<td></td>
<td>PSx-2-240-B</td>
<td>Ceramic bushing 17.7 mm</td>
<td>110</td>
<td>230V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PSx-3-240-B</td>
<td>Flange less - Retrofit</td>
<td>107</td>
<td>230V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PSx-4-240-B</td>
<td>Flange less - Retrofit</td>
<td>107</td>
<td>230V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PSx-5-240-B</td>
<td>G3/8&quot; flange - Retrofit</td>
<td>107</td>
<td>230V</td>
<td></td>
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<tr>
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<td>PSx-6-240-B</td>
<td>G3/8&quot; flange 17mm</td>
<td>107</td>
<td>230V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PSx-7-240-B</td>
<td>G3/8&quot; flange 17mm</td>
<td>107</td>
<td>230V</td>
<td></td>
</tr>
<tr>
<td>240W</td>
<td>PSx-1-120-W</td>
<td>Ceramic 26mm</td>
<td>107</td>
<td>120V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PSx-2-120-W</td>
<td>Ceramic bushing 17.7 mm</td>
<td>110</td>
<td>120V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PSx-3-120-W</td>
<td>Flange less - Retrofit</td>
<td>107</td>
<td>120V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PSx-6-120-W</td>
<td>G3/8&quot; flange 17mm</td>
<td>107</td>
<td>120V</td>
<td></td>
</tr>
</tbody>
</table>

*All lengths available upon request*
FKK Corporation producing OEM custom order ceramic silicon nitride igniters for gas and oil energy-efficient equipments. FKK Corporation is now one of the world’s leading producers of ceramic igniters for compact boilers and tankless water heater as well as Fuel Cell SOFC/PEFC appliances, covering Asia and America.

**Features**

**Long Rated life**
While standards igniters only last 2 or 3 years, FKK ceramics igniters are made to last at least 90000 hours (nearly 10 years) according to Japanese standard and made to be very resistant in all conditions (high humidity, freezing temperatures, strong vibrations, etc.). We are the unique maker in the world to be able to design SiN igniters with average life greater than 90,000 hours in continuous operation at nearly 1400°C.

**High temperture, high constraint**
FKK ceramics igniters can reach 1400°C. However, due to perfect sealing process, lead wire junction temperature do not exceed 150°C. You can miniturize your system, make it safer and prolonged the rated life of other components.

**Faster**
Rising temperature is faster: up to 1000°C in 6 seconds.

**High efficiency**
High-watt density discharge allow high thermic efficiency.

**Superior properties**
Highly resistant to mechanical strength, high temperature strength and thermal shock. Excellent electrical insulation, dielectric strength and thermal shock resistance.

**No electromagnetic discharge**
Contrary to spark electrode, ceramic igniters generate no electromagnetic interference so it can be safely use in systems and applications sensitive to electromagnetic discharge.

**Material**
- Silicone Nitride Si₃N₄

**Range of temperature**
- 1100–1400 °C

**Application**
- Furnace, burner, kiln
- Gas, oil water heater, boiler or other heating equipment
- SOFC, PEFC Fuel Cell MCHP burner and reformer
- Gas reforming
- Post gas combustion
- Laboratory equipment

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### SiN Ceramics igniters

Silicone Nitride Ceramic igniters

![SiN Igniter Diagram](image-url)

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**Range of temperature**
- 1100–1400 °C

**Application**
- Furnace, burner, kiln
- Gas, oil water heater, boiler or other heating equipment
- SOFC, PEFC Fuel Cell MCHP burner and reformer
- Gas reforming
- Post gas combustion
- Laboratory equipment
SiN Ceramic igniters properties

Si₃N₄ Ceramics igniters properties

Mechanical and Thermal Properties

<table>
<thead>
<tr>
<th>Items</th>
<th>Unit</th>
<th>SiN Igniter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum temperature</td>
<td>°C</td>
<td>1300</td>
</tr>
<tr>
<td>Typical temperature</td>
<td>°C</td>
<td>1200</td>
</tr>
<tr>
<td>Thermal conductivity</td>
<td>w/mk</td>
<td>25</td>
</tr>
<tr>
<td>Linear expansion coefficient</td>
<td>/°C(40-800°C)</td>
<td>3.2x10⁻⁶</td>
</tr>
<tr>
<td>Vickers hardness (500g load)</td>
<td>GPa</td>
<td>14.7</td>
</tr>
<tr>
<td>Bending strength</td>
<td>MPa</td>
<td>590</td>
</tr>
<tr>
<td>High-temperature strength</td>
<td>MPa</td>
<td>600</td>
</tr>
<tr>
<td>(Flexural strength at 800°C)</td>
<td></td>
<td>900</td>
</tr>
<tr>
<td>Thermal shock resistance</td>
<td>°C</td>
<td>600</td>
</tr>
</tbody>
</table>

Temperature coefficient of resistance

- Paste A: 3500PPM/°C (23–800°C)
- Paste B: 2960PPM/°C (23–800°C)
- Paste C: 1200PPM/°C (23–800°C)
Chemical characteristics (nitric acid resistance)

Corrosion Loss - 60% H₂SO₄

Corrosion Loss - 60% HNO₃

Corrosion Loss - 60% NaOH

All drawings and data-sheets are available for download at: https://www.plug.fkk-corporation.com/en/products/sin-ceramic-igniter

You can also scan the QR code to go directly on the related page.
SNx series igniters line up

Silicone Nitride Ceramics igniters standard products

Features

- High temperature 1200–1400°C
- 1000°C in 6 seconds
- High resistance to thermal shock (600–900°C)
- Designed for over 90000h of powering
- 90–120V, 220–240V current available
- Totally customizable solution, many design available

Line up

SNx-1
D.8mm x L40mm ceramic flange
1200°C type

SNx-2
M18 thread nut flange
1200°C type

SNx-3
D14mmx L30mm ceramic flange
1200°C type

SNx-4
D19mm x L50mm ceramic flange
1300°C type

SNx-5
M16 thread nut flange
1300°C type

SNx-6
32mm round metal flange
1300°C type
### Line up

#### 1200°C type

<table>
<thead>
<tr>
<th>Type</th>
<th>Reference</th>
<th>Flange type</th>
<th>Heater length (mm)</th>
<th>Available voltage (V)</th>
<th>Cable length (mm)</th>
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<tr>
<td>32~45W</td>
<td>SNx-1</td>
<td>Ceramic 8 x 40mm</td>
<td>38</td>
<td>100~120</td>
<td>350mm</td>
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<td>1200°C</td>
<td>SNx-2</td>
<td>M18 flange 24mm</td>
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<td>SNx-3</td>
<td>Ceramic 14 x 30mm</td>
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<td>47~65W</td>
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</table>

#### 1300°C type

*All lengths available upon request*

HZ = Heating zone

Unit (mm)
FKK provide all the major Japanese Fuel cell appliances manufactures as well as abroad MCHP SOFC systems maker with advanced ceramics igniters allowing long rated life (up to 90000 hours), high reliability, high temperature (up to 1300°C) and good sealing properties (lead wire temperature junction below 150-200°C). With high temperature performance you save energy on start-up burner gas pre heating operation, off-gas burner exhaust gas combustion as well as air preheating.

**Worldwide customer make the choice of FKK for several reasons**

- High reliability and quality: over 90000 hours (nearly 10 years) of rated life, Japanese quality
- Very high temperature: 1350°C, 1000°C in less than 6s
- High pressure resistance and very low temperature at lead wire junction (below 100-200°C)
- 30-60 Ohms resistance
- Power rating: 45-75 Watt
- Competitive cost: by providing major fuel cell makers, we achieved high cost/quality performance
- Major accounts within MCHP system integrator: Panasonic, Osaka gas, Tokyo gas, Eneos, Toshiba

**Systems**

- Micro CHP: SOFC / PEFC (high temperature)
- Back up power
- Stirling engine

**Application**

- Igniter for gas pre-heating
- Igniter for start-up burner
- Igniter for off-gas burner
- Igniter for cathode air preheater
- Igniter for SOFC/PEFC reformer high temperature burner

**References**

- Osaka gas Ene-Farm
- Panasonic Ene-Farm
- Toshiba Fuel cell
- Toyota fuel cell
- Tokyo gas fuel cell
- JX Eneos fuel cell
**Advanced Ceramic**

FFK can design and provide fine ceramics components.

Engineered material, fine ceramics or technical ceramics support the development of cutting-edge technology.

With more than 60 years as major Japanese ignition electrode maker experience, FFK Corporation engineers developed a strong expertise in designing, manufacturing various technical ceramics products and components.

<table>
<thead>
<tr>
<th>Material</th>
<th>( \text{Al}_2\text{O}_3 )</th>
<th>( \text{Al}_2\text{O}_3 )</th>
<th>( \text{Al}_2\text{O}_3 )</th>
<th>Mullite</th>
<th>Porcelain</th>
<th>( \text{MgO-SiO}_2 )</th>
<th>( \text{Zircon} )</th>
<th>Cordierite</th>
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<td>%</td>
<td>95</td>
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<td>Bending strength</td>
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<td>280</td>
<td>270</td>
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<td>2000</td>
<td>1470</td>
<td>411</td>
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<tr>
<td>Coefficient of thermal expansion</td>
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<td>RT~200°C</td>
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<td>10^{12}</td>
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<td>( &gt;10^{11} )</td>
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<td>200°C</td>
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<td>( &gt;10^{12} )</td>
<td>( &gt;10^{12} )</td>
<td>10^{9}</td>
<td>10^{9}</td>
<td>10^{12}</td>
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<td>10^{8}</td>
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<td>10^{7}</td>
<td>10^{7}</td>
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<td>5.5</td>
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<td>Powder molding</td>
<td>Extrusion slip casting</td>
<td>Length-wise possible</td>
<td>Variety injection molded</td>
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