

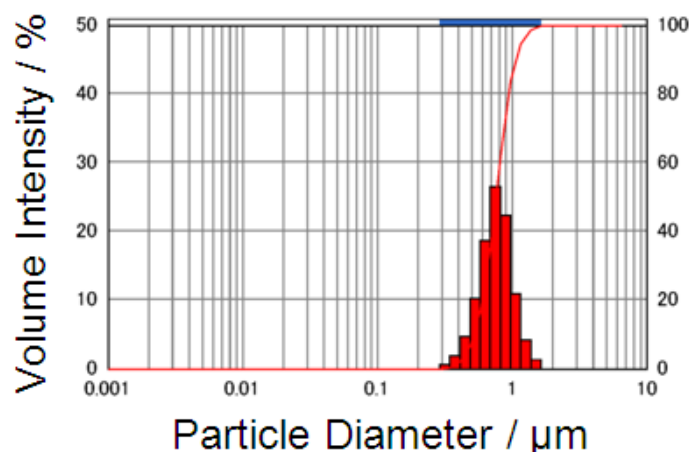
## Visible Light Response Type Photocatalytic Materials (Silver Nano Colloides, Hydroxy Apatite complex type)

### Metal doped $\text{TiO}_2$ , $\text{WO}_3$ Carbon Nitride : $\text{C}_3\text{N}_4$

We have researched and developed visible light response type photocatalytic materials. They are metal doped  $\text{TiO}_2$ ,  $\text{WO}_3$  and  $\text{C}_3\text{N}_4$  series. We had modified the surface and bulk property of  $\text{TiO}_2$  and  $\text{WO}_3$  to possess visible light response. In addition, we have successfully synthesized cutting edge materials as  $\text{C}_3\text{N}_4$ . Moreover, by making complex with silver nanocolloids and hydroxyl apatite, they can absorb (night time, in the dark) and decompose bacteria (day time, under illumination). This is very original to our company technology. Below figure indicates the photo degradation rate property of methylene blue with our photocatalytic materials.

### Particle Diameter Distribution

Based on our fine particle dispersion technique, we can control the size of nano particle diameter, such as to make particle size smaller in order to increase the available chemical reaction site, in order to obtain more photocatalytic sites at surface. Please consult us anytime to modify particle size diameter including surface properties.



We are also developing printable ink or paint as visible light response type photocatalytic paint using metal doped TiO<sub>2</sub>, WO<sub>3</sub> and C<sub>3</sub>N<sub>4</sub> with water, or any type of organic solvent.

For example, below table indicates the basic property of paint or ink slurry.

<b>TiO<sub>2</sub>, WO<sub>3</sub> or C<sub>3</sub>N<sub>4</sub></b>	<b>10.0 – 40.0 %</b>
<b>Resin and additive</b>	<b>0.8 – 12.0 %</b>
<b>Silver Nano Colloids</b>	<b>0.01 - 5.0 %</b>
<b>Hydroxy Apatite</b>	<b>0.01 - 10.0 %</b>
<b>Water or Organic Solvent (Terpineol, NMP, MIBK, Toluene, BCA etc...)</b>	<b>50.0 - 80.0 %</b>
<b>Viscosity</b>	<b>4.0 – 300000 mPa·s/ 25 °C</b> <b>(Viscosity can be modified for customer's request for their printing method)</b>
<b>Particle size of FUJI ASL TiO<sub>2</sub> or WO<sub>3</sub></b>	<b>60.0 nm – 300.0 nm</b>

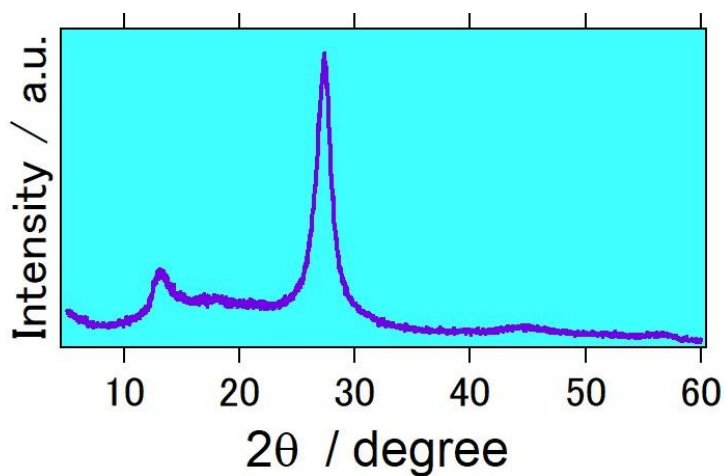
We can prepare ink or paint slurry either organic solvent base such as IPA (iso propyl alcohol), MEK (n-methyl pyrrolidone), NMP (N- Methyl pyrrolidone) etc.....and water. We can also modify the particle size, concentration of other additives such resin or dispersing chemical etc... We will prepare suitable ink using appropriate resin and chemicals in order to have strong adhesion towards substrate such as PET, PP, PE film, glass, metal, or ceramic substrate, as customer requests. Furthermore, we can perform surface coating, metal doping and so on, in order to modify particle property. (To prevent substrate damage caused by TiO<sub>2</sub>, WO<sub>3</sub> or C<sub>3</sub>N<sub>4</sub> photocatalytic property itself). In addition, we can also modify the amount of silver nanocolloids and hydroxy apatite to control the effect of decomposing and absorbing the bacteria.

We will be glad to discuss with your detail technical request anytime.

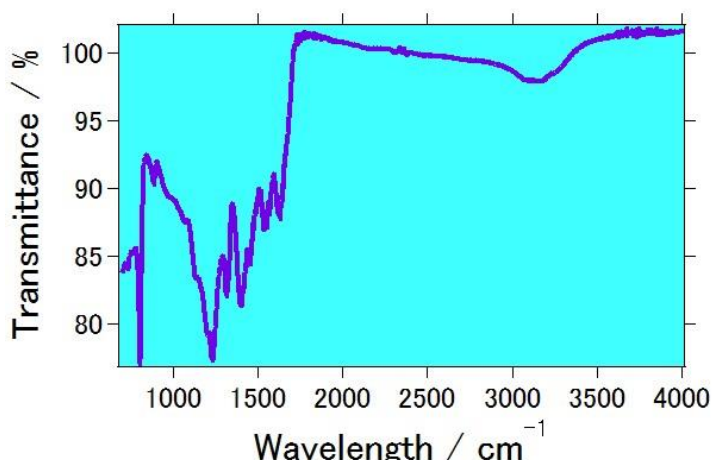
Thank you in advance.



graphite like carbon nitride (g-C3N4)



XRD of graphite like carbon nitride (g-C3N4)



FT-IR of graphite like carbon nitride (g-C3N4)