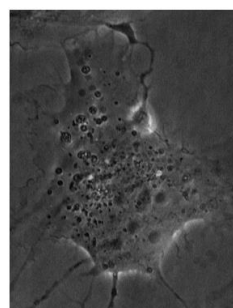


Particulate Thermoprobe (for measuring average intracellular temperature)

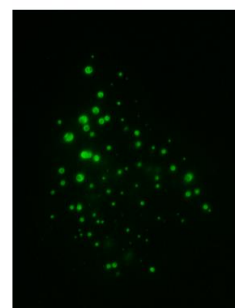
Product Background

Particulate Thermoprobe is a fluorescent nanogel thermometer for living cells. It aggregates in proportion to increase in the temperature and fluorescence intensity is proportional to its aggregation. Fluorescence intensity is observed by fluorescence microscopy. Thermoprobe measures the average temperature of the whole cells, and it provides unprecedented experimental approach.

Phase-contrast image



Fluorescence image



Phase-contrast and fluorescence images of a living COS7 cell containing the Particulate Thermoprobe.

Description

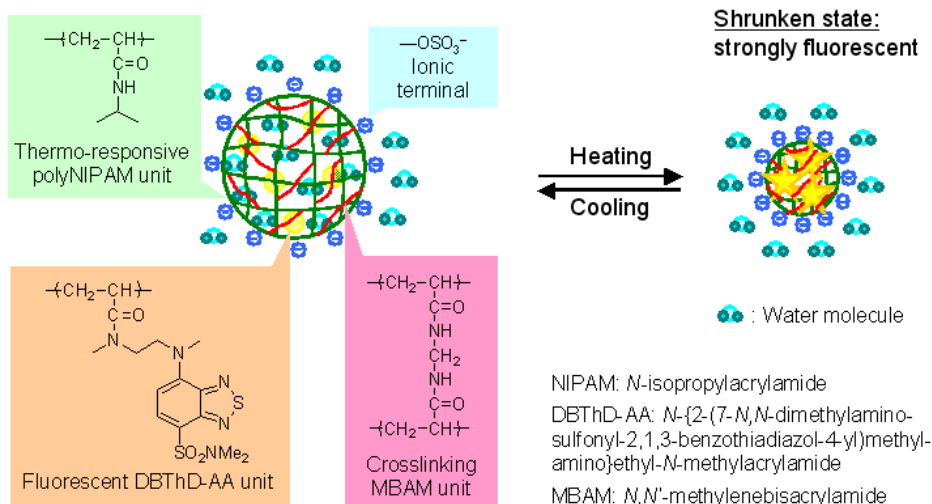
Catalog Number: FDV-0003

Lot Number: see vial label

Size: 100μg

Structure & Functional diagram

Swollen state: weakly fluorescent



Average Diameter: 48 nm

Purity: >99%

Appearance: Yellow powder

Solubility: Soluble in water

Temperature resolution: better than 0.5°C

License: This product is licensed by Tokyo University

Reconstitution and Storage

Shipping: Shipped on ambient temperature

Storage: Store at ambient temperature (powder). For reconstituted solution, store at +4°C. Protected from light.

Reconstitution: Reconstitute at 10 mg/ml in 80 mM KCl, 10 mM K₂HPO₄, 4 mM NaCl.

Reconstitution and microinjection

1. Before open the top, spin vial down briefly.
2. Reconstitute 100µg powder of Particulate Thermoprobe at 10µl of 80 mM KCl, 10 mM K₂HPO₄, 4 mM NaCl.
3. Dissolve it completely by vortex or tapping etc.
4. Stand it at +4°C for overnight (at least 8 hours).
5. Take 1µl solution from vial, and fill it up to glass capillary needle for microinjection.
6. Microinject it into cytoplasm with a glass capillary needle below 30°C*1.
7. Leave cells for 30min.
8. Analyze intracellular temperature by fluorescence microscopy with an excitation at 460 nm and an emission at 560 nm.

*1 At higher temperature, it may cause clog.

How to generate calibration curve

1. After microinjecting Particulate Thermoprobe into cytoplasm, set the temperature at the lowest you want (e.g. 22°C).
2. Leave cells at least 30 min.
3. Measure the fluorescence intensity for single whole cell.
4. Increase the temperature at your choice (e.g. 23°C).
5. Leave it at least 1 min (until medium temperature will be steady).
6. Measure the fluorescence intensity for single whole cell.
7. Repeat step 4-6 until signal intensity reach plateau to obtain a calibration curve.
8. Estimate the temperature of your sample based on the calibration curve.

Note: Above methods (Reconstitution and microinjection, and How to generate calibration curve) is not only way to measure/calibrate cellular temperature. Optimize and establish the best condition at your own.

References

- 1) Uchiyama S, et al., Chem. Eur. J. 2012 Jul 27;18(31):9552-9563
- 2) Gota C, et al., J. Am. Chem. Soc. 2009; 131: 2766-2767

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