

Development of a Pipe-type Module for a Power Generating Heat Exchanger

We have developed a pipe-type thermoelectric module for use in heat exchangers that can simultaneously generate steam superheated above 100°C and electricity from the combustion heaters and cooking stoves. Thermoelectric ceramics, which are stable even in extremely hot air, are used to cover stainless steel tubes in electricity generating modules. This cover prevents the contact between flame and the stainless steel tube that acts as a heat exchanger, protecting the metal tube and extending the useful life of the heat exchanger. Control of the flame temperature will suppress the formation of nitrogen oxides (NO_x) or carbon monoxide (CO), which are products of incomplete combustion.

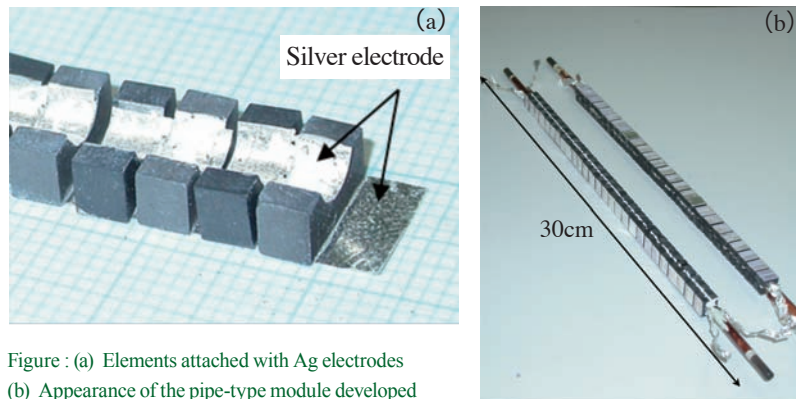


Figure : (a) Elements attached with Ag electrodes
(b) Appearance of the pipe-type module developed

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Development of a Nano-scale Dispersion Technique for Immiscible Polymer Blends

We have developed a new polymer-blending technique with a high-shear flow field without any additives. The technique realized nano-scale dispersion of immiscible polymers. The domain sizes of the dispersed polymer phase are over one order smaller than those prepared using conventional methods. Our technique is also considered to be useful for inorganic dispersants such as carbon nanotubes. As no additive is necessary, the technique is also applicable to medicines and cosmetics.

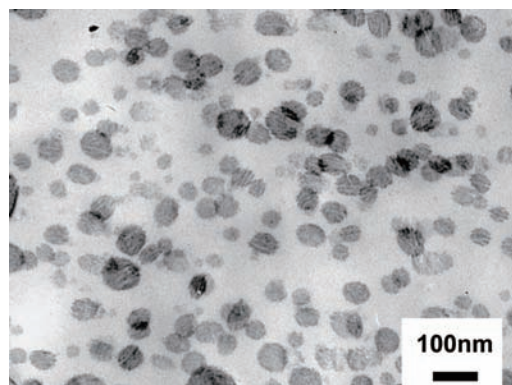


Figure : A transmission electron microscope image of a PVDF/PA11 blend prepared using high-shear processing. PA11 of ten to several tens of nanometers in diameter (round black parts) is homogeneously dispersed densely in the PVDF matrix (white background region).

PVDF : poly (vinylidene fluoride)
PA11 : polyamide 11

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