

# Supporting Information

## Processing of Polyacetylene from Aqueous Nanoparticle Dispersions

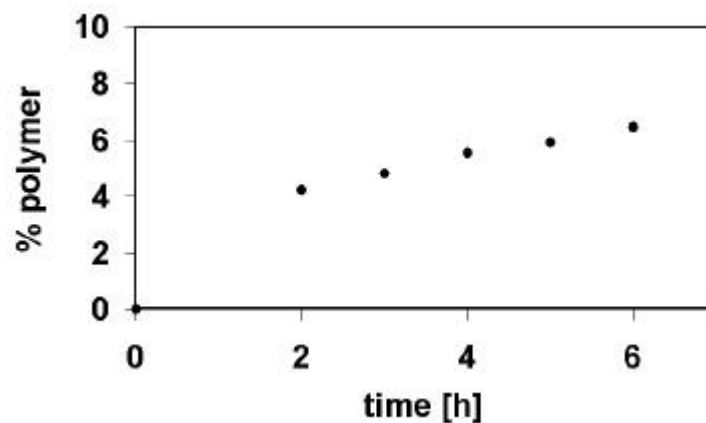
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**General considerations.** All manipulations (catalyst preparation and polymerizations) were performed using standard Schlenk techniques under an argon atmosphere. Electrical conductivities were measured with a King Craft MD42079 Multimeter.

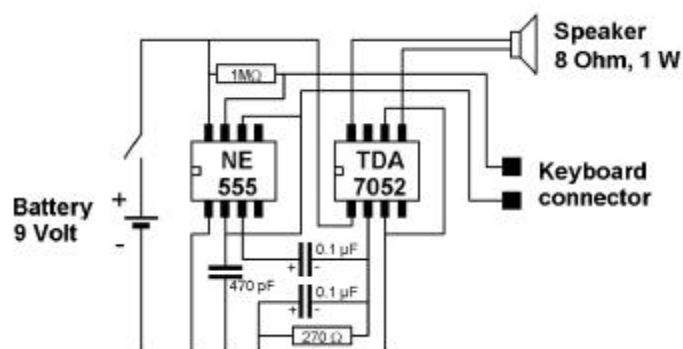
**Materials.** Acetylene of 99 % purity was supplied by Sauerstoffwerk Friedrichshafen as an acetone solution absorbed in diatomaceous earth, and used without further purification. Hexane and ethanol were degassed by repeated freeze-pump-thaw cycles. Deionized water was degassed by distillation under nitrogen prior to use. Sodium dodecyl sulfate (SDS) was purchased from Fluka and degassed under argon prior to use. 1,3-Bis(di-tert.-butylphosphino)propane (**1**) was prepared according to literature procedures from di-t-butylphosphine and 1,3-dichloropropane.<sup>1</sup>

**Ink-jet printing:** A polymer dispersion (e.g. 4 wt.-% polyacetylene content) was adjusted to a total SDS concentration of 2 wt.-%, and mixed with 5 vol.-% glycerol. This dispersion was filled into a carefully cleaned cartridge and mounted in a commercial ink-jet printer. The layout of the structure to be printed was generated with Cadsoft Eagle 4.01. For printing, photopaper or regular paper were used (as specified). In the case of printed polyacetylene circuits, these were subsequently doped by covering the circuit with iodine crystals for 10 min.

1) N. Carr, B. J. Dunne, L. Mole, A. G. Orpen, J. L. Spencer, *J. Chem. Soc. Dalton Trans.* **1991**, 863-868.



**Figure S1.** Amount of polyacetylene formed over time during aqueous dispersion synthesis (total volume of reaction mixture: 50 mL; 90  $\mu\text{mol}$  Pd; room temperature; acetylene atmosphere of ambient pressure).



**Figure S2.** Circuit diagram of sound generator for ink-jet printed 'keyboard'.