On the electropolymorization of acrylonitrile as
effected by cyclic voltammetry and 
chronoamperometry method

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Electropolymorization is now emerging as a branch of 
electrochemistry that combines the potentiality of that discipline of 
that and the characteristic features of polymer science.

Mengoli reviewed the potentiality of electropolymorization in 
polymer coating[1], which is however limited by the long term 
instability of the polymer/solid substrate interface. In 1988, C. Boiziu 
and G. Lecayon[2] raised a great prospect by claiming that 
polyacrylonitrile (PAN) could be grafted onto the usual metals (e.g., 
Ni) by electropolymorization.

In this work PAN layers were electrochemical deposited on the 
Cu-electrode by CV and chronoamperometry, respectively: a Pt plate 
as a counter electrode, Ag / AgCl (sat. KCl-AgCl solution) as a 
reference electrode, and with AN solution in acetonitrile 
tetraethylammonium perchlorate (5 x 10^-3 M) as a conducting salt.

The molecular weight and increase weight of PAN were 
measured according to AN-concentration, scan rate, and cycle 
number/or time: from 5 x 10^2 to 5 M AN for AN concentration, from 
20mV/so 100mV/s for a scan rate, from 10 to 90 for a cycle number, 
from 10 to 60 min for time.

Figure 1 shows the device of electropolymorization of AN. Figure 
2 confirmed the existence of the two reduction peaks at -1.8 and -2.7 
V. The fracture surface of PAN layer performed by CV and 
chronoamperometry, respectively was observed by SEM image. The 
mechanism for electropolymorization of AN were discussed.

Reference

Figure 1. The device of electropolymorization of AN

Figure 2. Cyclic voltammetry of AN on Cu-substrate in 0.05 M 
TBAP solution in ACN. [AN] = 0.05 M; scan rate = 20mV/s