



# Separation of Oligo(acrylic acid) by Capillary Electrophoresis



*CE appears as a highly powerful alternative to SEC separation for polymer characterization*

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Developments carried out in ENSIACET (Toulouse) and directed by Patrice Castignolles and Marion Gaborieau (WSU, Australia)

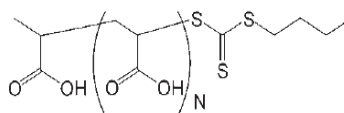
## INTRODUCTION

Oligoacrylates are a key material in an increasing number of applications from the paint and coating industry. Short polyelectrolyte chains are used to stabilize emulsions and play an important role in paints and coatings controlled mineralization. This Application Note, inspired by P. Castignolles works [1,2], describes the use of Wyn-CE capillary electrophoresis system to the characterization of oligoacrylates. RAFT agents allowed the control of molar masses in the radical polymerization of acrylic acid.

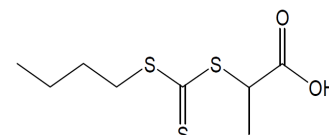
## STANDARD AND REAL ANALYSIS

**Buffer :** borate buffer  
**Capillary :** fused-silica capillary, L = 40 cm, ID = 50  $\mu\text{m}$   
**Injection :** Hydrodynamic, 50 mbar, 6 s  
**Voltage :** 23 kV  
**Detection :** UV, 195 nm  
**Temperature :** 25  $^{\circ}\text{C}$

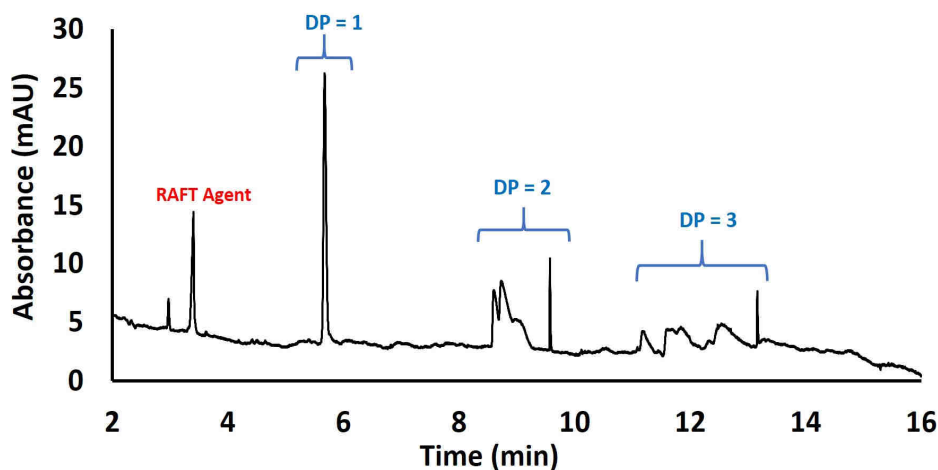
## Chemical Structures



Oligoacrylate



RAFT agent



## Example of separation of oligoAA separation by capillary electrophoresis.

« The higher  $R_s$  separation obtained indicates that CE is a suitable technique for understanding the oligomerization taking place in the aqueous phase during emulsion polymerization involving acrylic acid ». Castignolles et al. [1]

## The advantages of Capillary Electrophoresis vs Size Exclusion Chromatography



CE resolution is significantly higher



Fast separation. Gain x2 on analysis



Low Sample volumes needed. No solvent



Capillaries are significantly less expensive than SEC Columns

[1] Castignolles et al., *Macromol. Rapid Commun.*, 2006, 27, 42-46 // [2] Gaborieau et al., *Aust. J. Chem.*, 2010, 63, 1219-1226