A Method for Studying the Diffusion of Quaternary Ammonium Cations Through Polymer Phases[†]

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The mobility of organic cations in polymeric phases is an important property to consider when using these materials as active ingredients in coatings. Here we describe a method for extracting such compounds from polymeric samples and how analysis of these extracts can yield insights about the diffusivity of molecules in a polymeric phase.

1 Introduction

Diffusion in polymeric phases is an important phenomenon which influences many fields. The ability to control the release of active compounds from a polymeric vehicle may be influenced by the diffusivity of these compounds, especially when strong interactions exist between the active compound and the vehicle. Particularly interesting are those cases in which these interactions can be modified to tune the diffusivity of the mobile compound.

In order to assess how different structural features assess the diffusivity of an analyte, the kinetics of analyte release must be measured. The methods used to effect this measurement are highly dependant on both the nature and quantity of the analyte of interest.

Table 1 Some typical methods used to detect different types of analyte

Analyte	Detection Method	Sensitivity
Transition metal	Flame Photometry	10-1000 ppm
	Flame AAS	1-100 ppm
	Flame AES	< 1 ppm
Organic Cations	HPLC-MS	10ppb - 10 ppm
	GC-MS	10ppb - 10 ppm
	qNMR	10 - 1000 ppm

2 Equations

Equations can be typeset inline *e.g.* $y = mx + c$ or displayed with and without numbers:

$$A = \pi r^2$$

$$\frac{\gamma}{\varepsilon x} r^2 = 2r \tag{1}$$

You can also put lists into the text. You can have bulleted or numbered lists of almost any kind. The `mhchem` package can also be used so that formulae are easy to input: `\ce{H2SO4}` gives H_2SO_4.

For footnotes in the main text of the article please number the footnotes to avoid duplicate symbols. *e.g.* `\footnote[num]{your text}`. The corresponding author $*$ counts as footnote 1, ESI as footnote 2, *e.g.* if there is no ESI, please start at [num]=[2], if ESI is cited in the title please start at [num]=[3] *etc.* Please also cite the ESI within the main body of the text using †.

3 Conclusions

The conclusions section should come at the end of article. For the reference section, the style file `rsc.bst` can be used to generate the correct reference style.

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Table 2 An example of a caption to accompany a table – table captions do not end in a full point

Header one	Header two	Header three	Header four	Header five	Header six	Header seven
1	2	3	4	5	6	7
8	9	10	11	12	13	14
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