

Vocational School Munich Chemistry/Biology Dr. Bernhard Thum	Chromatography
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Analysis No. 1: Paper chromatographic separation of felt pen colorants

Analysis samples:

Various felt pens of different colors

Mobile solvent:

Mobile solvent 1: n-propanol / water / glacial acetic acid 50/40/10 (V/V)

Mobile solvent 2: n-propanol / water 80/20 (V/V)

Mobile solvent 3: n-propanol / water 50/50 (V/V)

Mobile solvent 4: n-propanol / water 20/80 (V/V)

Mobile solvent 5: n-propanol / water / ammonia conc. 50/40/10 (V/V)

Assignment:

- Testing of different mobile solvents for the paper chromatographic separation of various colorants that are used for felt pens. 2 (3) mobile solvents are to be tested by a team of 2 (3) students → there is one chromatographic analysis for each student
- Evaluation of the given mobile solvents (separation efficiency, appearance of chromatographic band, duration of analysis)
- Evaluation of the results (how many colorants are there altogether, are there differences/ similarities to be found in the given samples?)
- Determination of the R_f-value for the individual colorant and editing of data in a spreadsheet
- Documentation of the whole analysis and evaluation of found data

Experimental procedure:

After the chromatographic flow direction is determined, cut several pieces of paper with the dimension of 20 by 20 centimetres (1 inch = 2.54 cm) and mark the flow direction with a pencil. Mark the starting line approx. 2 cm from the lower brink. Here apply at least 10 samples as a streak. Vertically fold the paper left and right (fringe 1 cm), so it will stand firm and upright even in a moist condition. After that the development will take place in a chromatographic chamber. For each team the same samples are to be applied for the different mobile solvents.

Please don't develop more than 2 chromatograms per chamber!

After the run is finished the paper is to be taken from the chamber und dried, for which a drying oven can be used. The *solvent front* can only be marked when the paper is at least half dry (after the paper is taken from the chamber, the mobile solvent will move on a little bit, so it makes no sense to immediately mark the front).

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Definition of the Rf-value:

The abbreviation Rf stands for retention factor. $Rf = \text{migration distance (substance)} / \text{migration distance (solvent front)}$.

The migration distance of the solvent front (beginning at the starting line) has to be measured over the distance which each substance has moved during the separation. To determine the migration distance of the substance the distance from the starting line to the concentration centre is to be measured.

The Rf-value can take values between 0 and 1.

Form of journal:

Please produce an overall journal which states used chemicals and tools, experimental procedure, analysis and results. *Charts* and *illustrations* are to imbedded as *text fields* into the word document and inscribed clearly.

