Equipment Schematic Procedure for preparation of THC-SH from THC (Tetrahydrocannabinol)

Introduction:

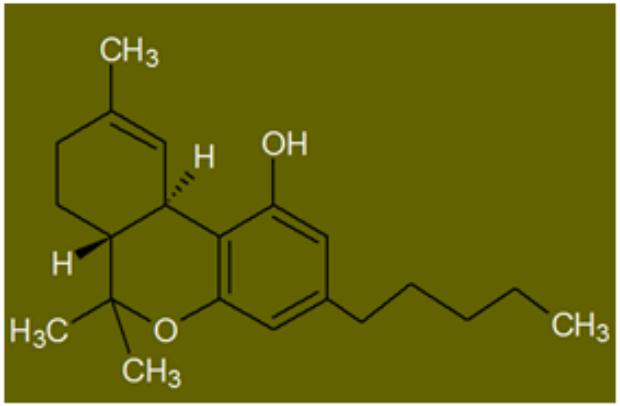
The present procedure comprises the Equipment Schematic P procedure and an efficient process for converting THC (Tetrahydrocannabinol) to its ester THC-HS (Tetrahydrocannabinol-hemisuccinate). The almost quantitative yield of conversion of THC to its ester distinguishes this reaction from majority of other organic reactions which have less yield of conversion or even from its prior art.

In this reaction the THC is esterified by reaction with an acid anhydride in the presence of a 4-aminopyridine either alone or in admixture with an organic amine triethyl amine. The esterified THC is purified by column chromatography and or by High Pressure Liquid Chromatography (HPLC).

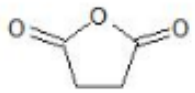
Tetrahydrocannabinol (THC), or more precisely its main isomer (−)-trans-Δ9-tetrahydrocannabinol ((6aR,10aR)-delta-9-tetrahydrocannabinol), is the principal psychoactive constituent of cannabis. This compound can be an amber or gold colored glassy solid when cold, and becomes viscous and sticky if warmed.

There are thirteen different procedures of conversion of THC to THC-HS with a wide range of 98-14% yield. The present procedure is the 98% yield. The detailed procedure has been already provided in the previous report. Here the schematic procedure from the equipment and practical point of view is introduced.

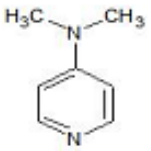
Procedure for 98% conversion of THC to THC-HS



THC
Tetrahydrocannabinol
Molar mass 314.469 g/mol

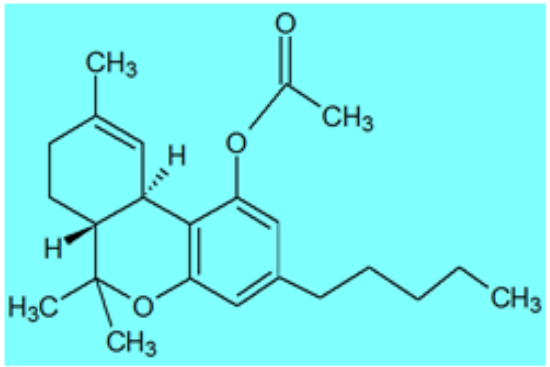
1)  Succinic Anhydride

2) $(C_2H_5)_3N$ Triethylamine



3) 4-dimethylaminopyridine

4) In CH_2Cl_2 methylene chloride

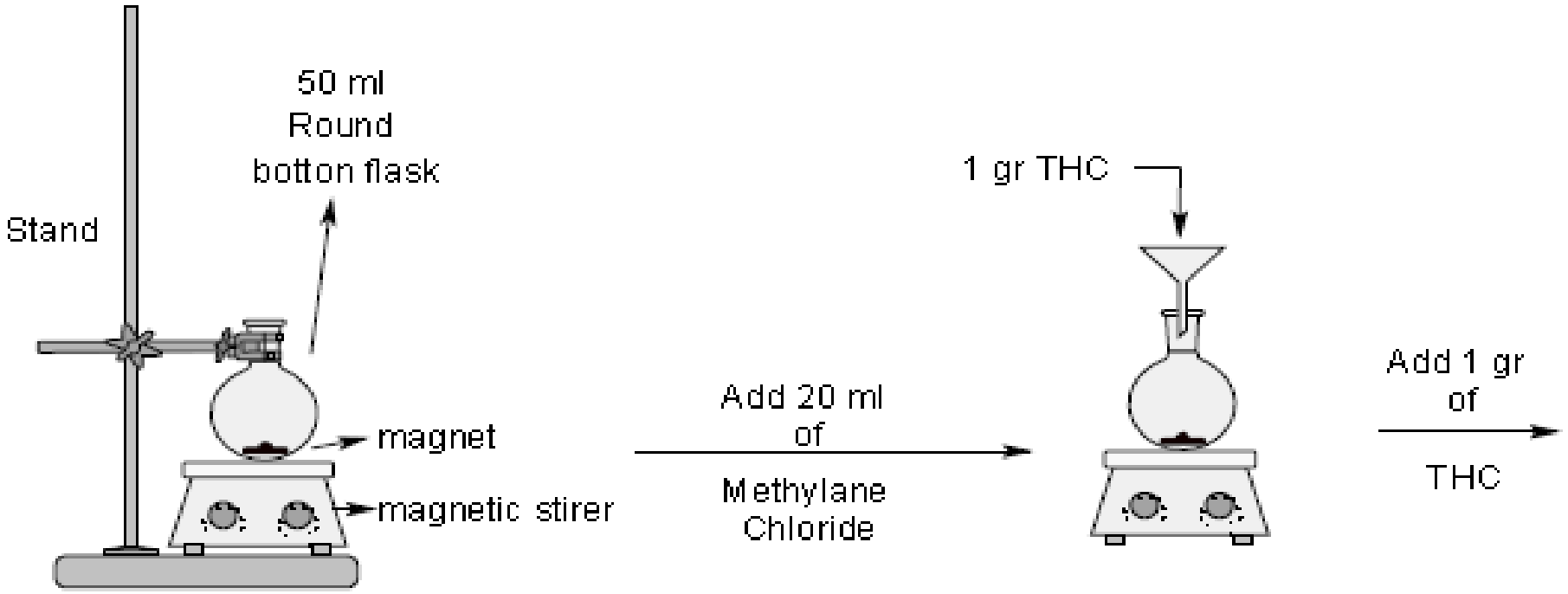


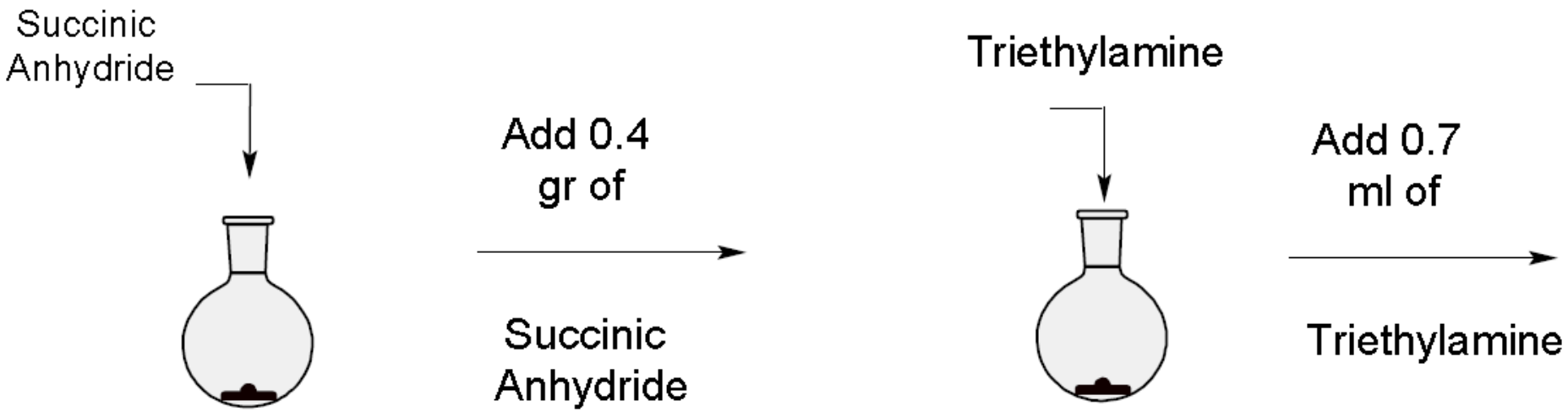
THC-SH
Tetrahydrocannabinol-hemisuccinate
Molar mass 356.469 g/mol

Schematic Equipment Procedure:

Step 1:

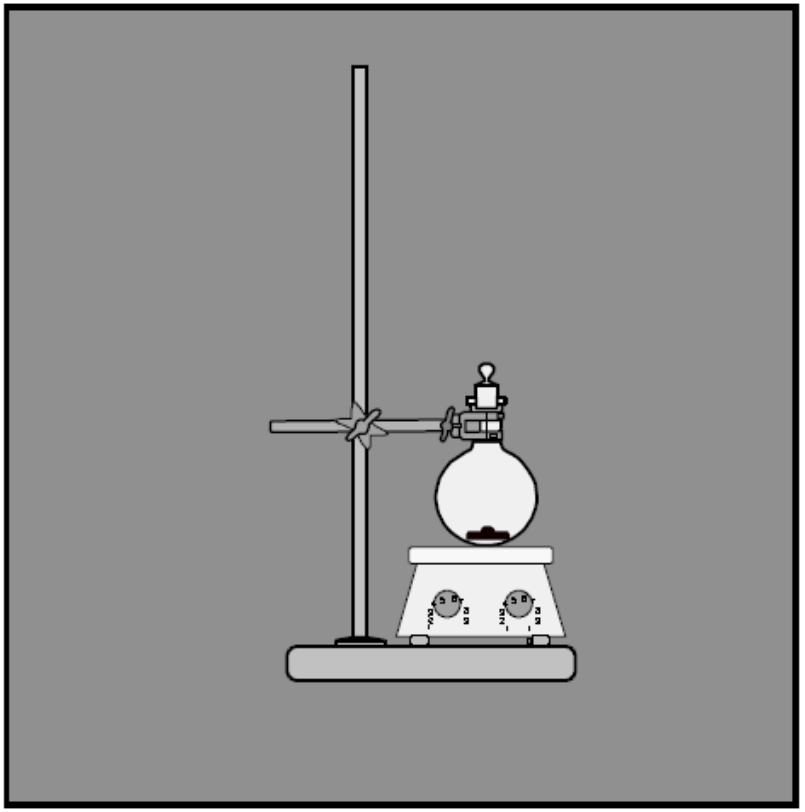
To 1 g of THC (92% purity) add 0.46 g succinic anhydride, 0.7 ml triethylamine, 80 mg 4-dimethylaminopyridine and 20 ml methylene chloride and keep the reaction mixture at room temperature in dark for 24 hours.


50 ml
Round
botton flask
Stand
magnet
magnetic stirer
Add 20 ml
of
Methylane
Chloride
1 gr THC
Add 1 gr
of
THC


Succinic
Anhydride
Add 0.4
gr of
Succinic
Anhydride
Triethylamine
Add 0.7
ml of
Triethylamine

4-dimethyl amino Pyridine

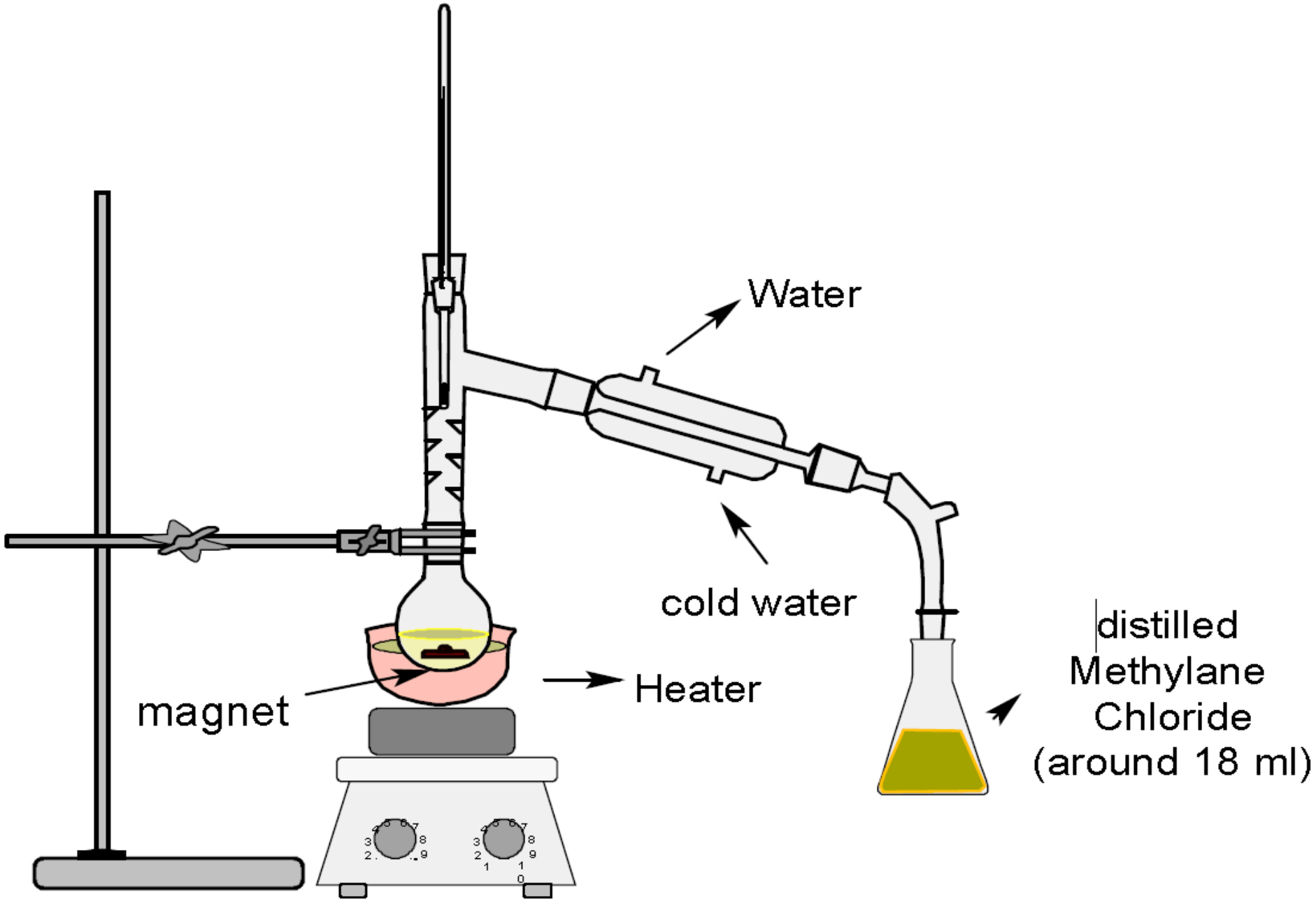
Add 80 mg of 4-dimethyl amino Pyridine

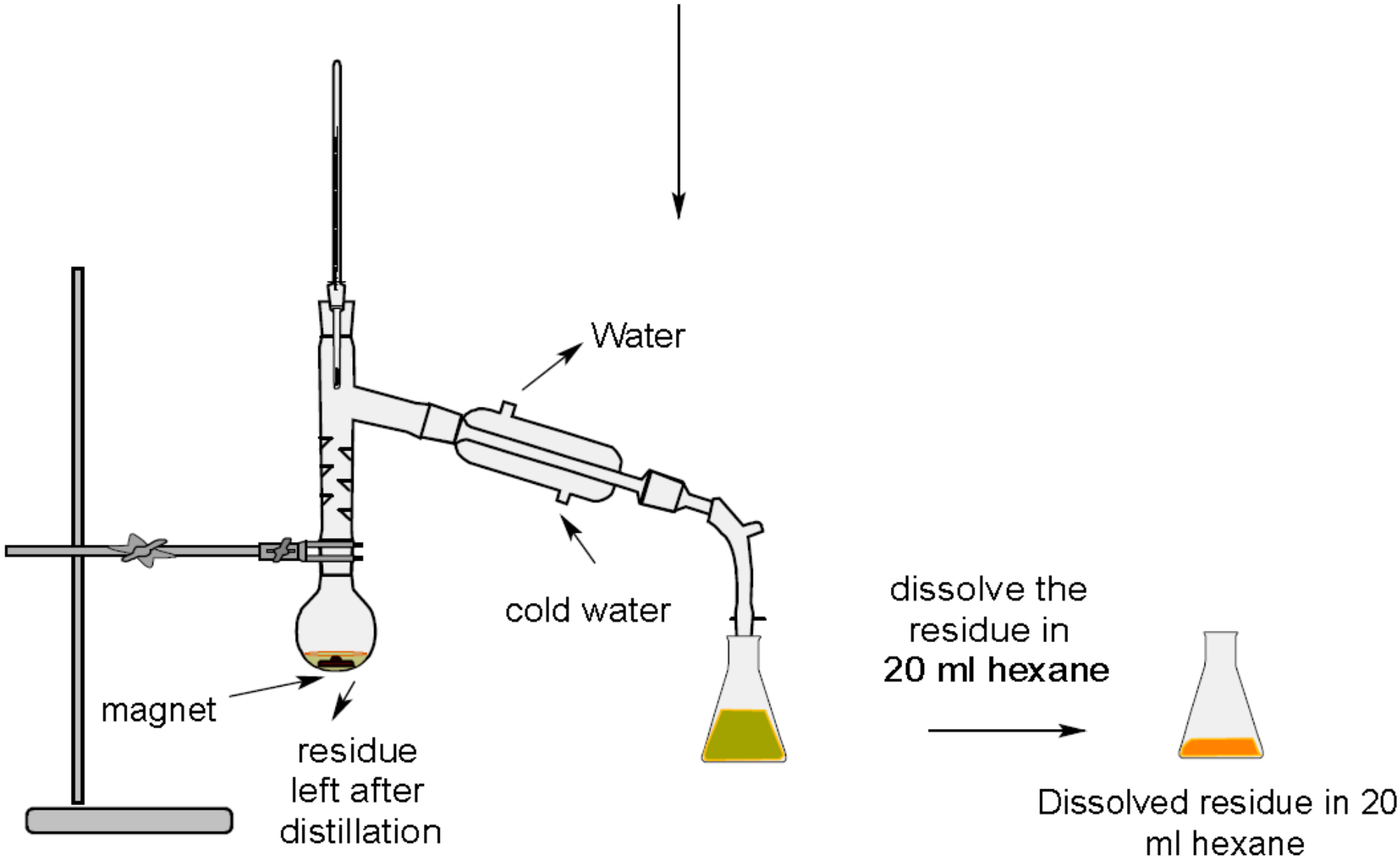


Stir for 24 hrs at room temperature in dark room

Step 2:

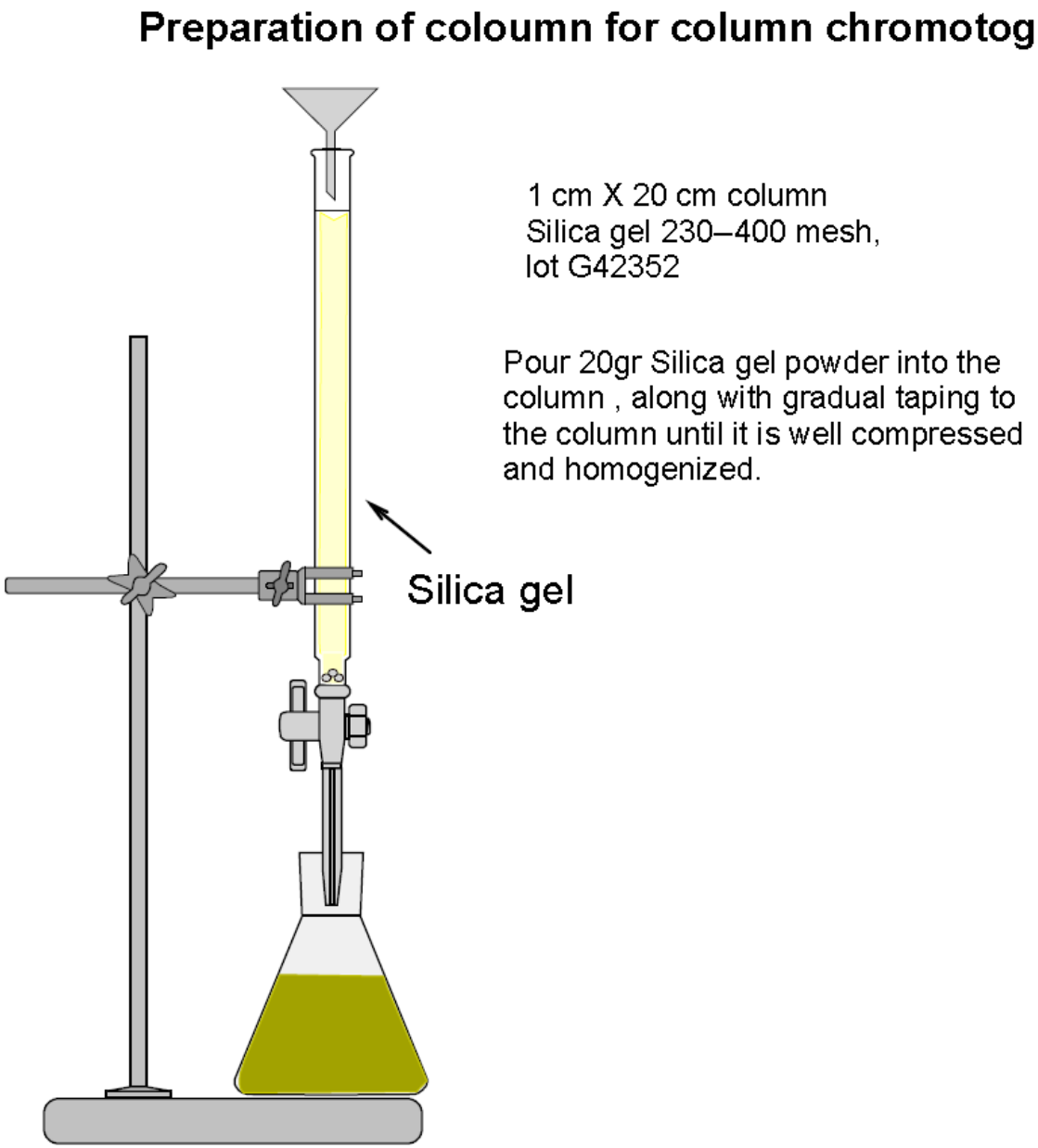
Distill off The solvent through a regular distillation apparatus (avoid vigorous heating of the container flask. The distillation heating should be performed gently) and dissolve the residue in 10 ml hexane.


Water
cold water
distilled
Methylane
Chloride
(around 18 ml)
Heater
magnet


Water
cold water
magnet
residue
left after
distillation
dissolve the
residue in
20 ml hexane
Dissolved residue in 20
ml hexane

Step 3:

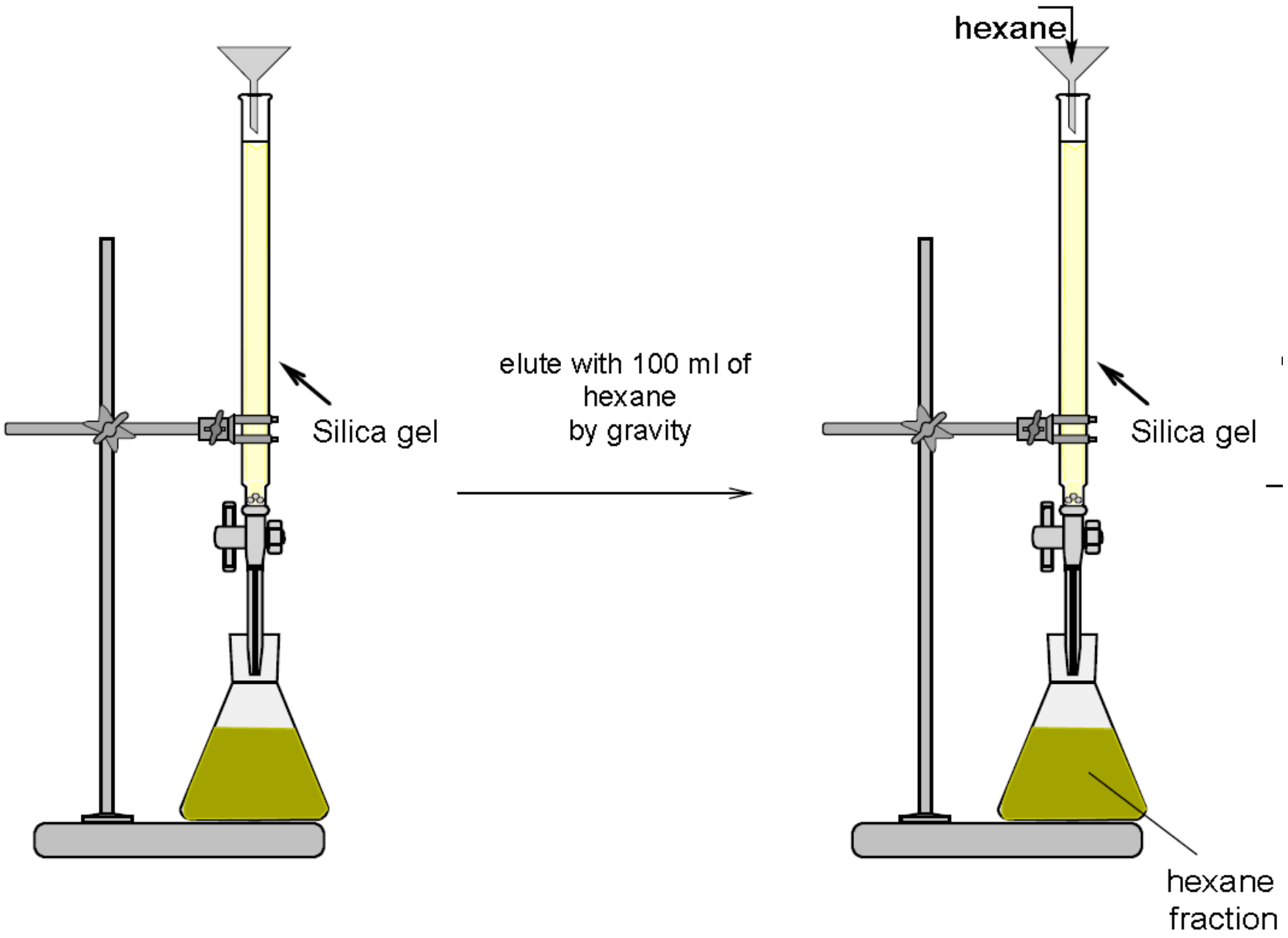
Transfer the hexane solution on to the top of a silica gel column [10 g silica gel, 230--400 mesh, lot G 42352, dimensions:

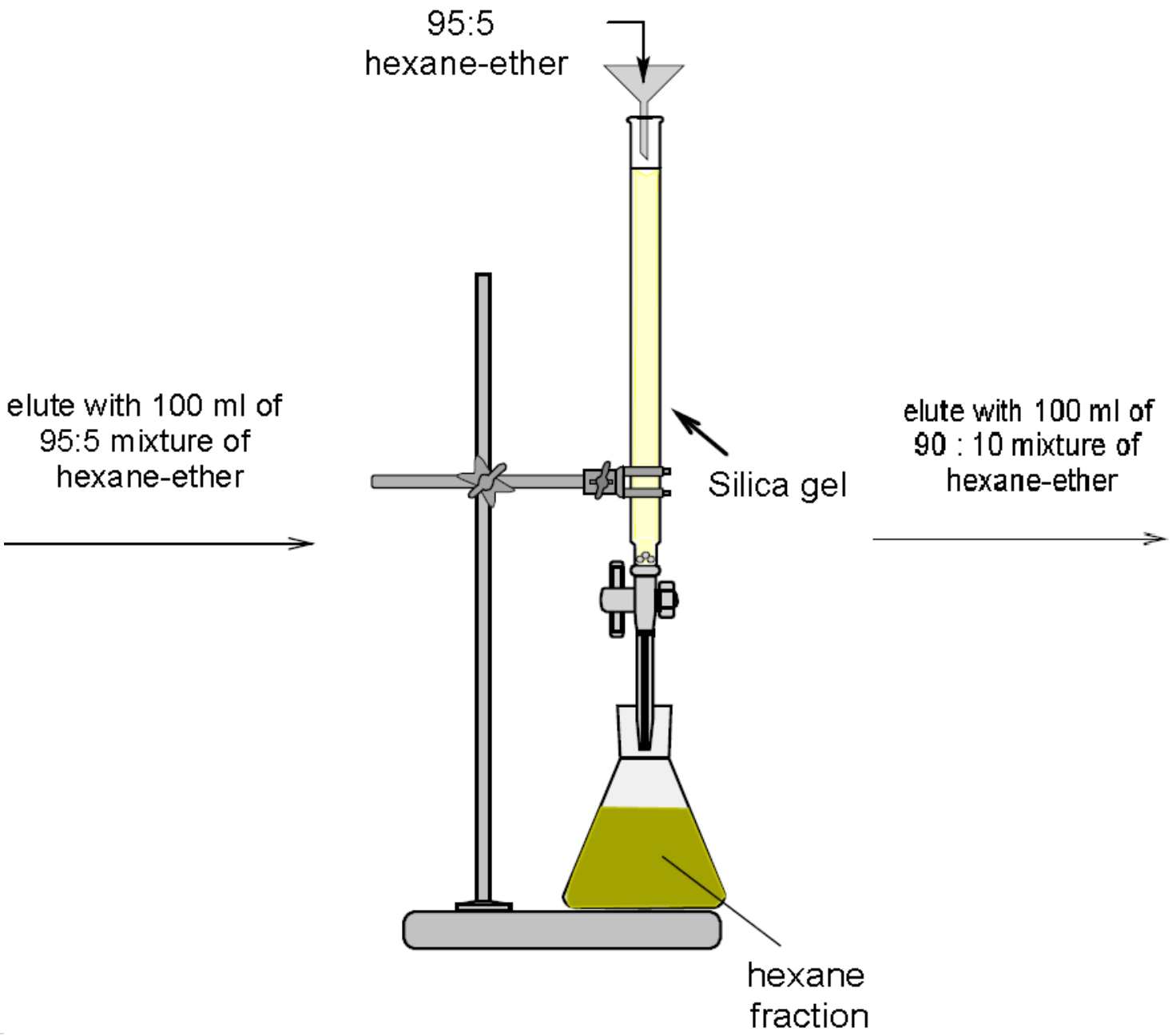


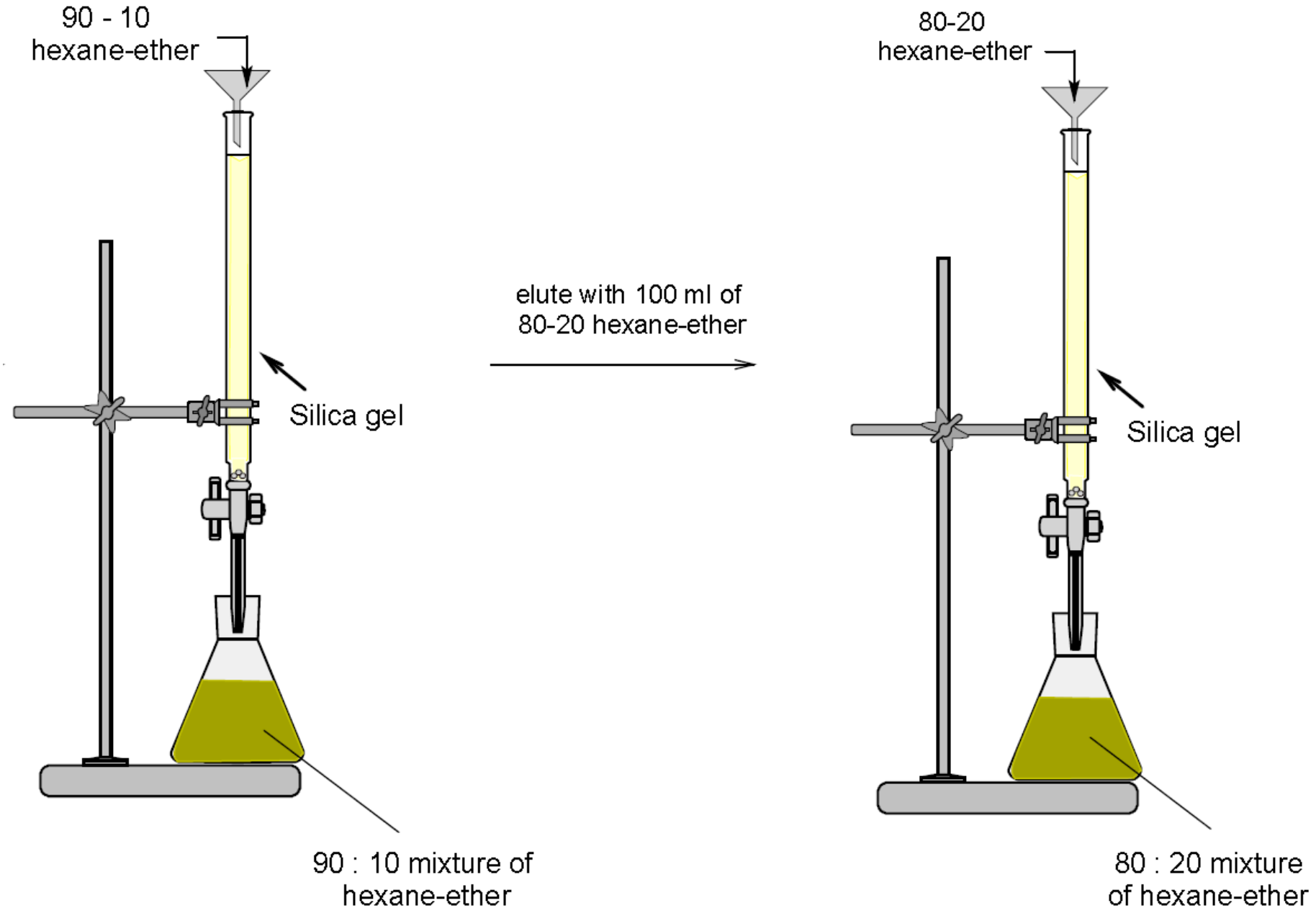
1x50 em]. Elute the column with hexane , 100 ml of hexane, followed by 100 ml of(95:5) mixture of hexane-ether, then with 100 ml of (90:10) mixture of hexane-ether and finally with 100 ml of (80:20) mixture of hexane-ether.

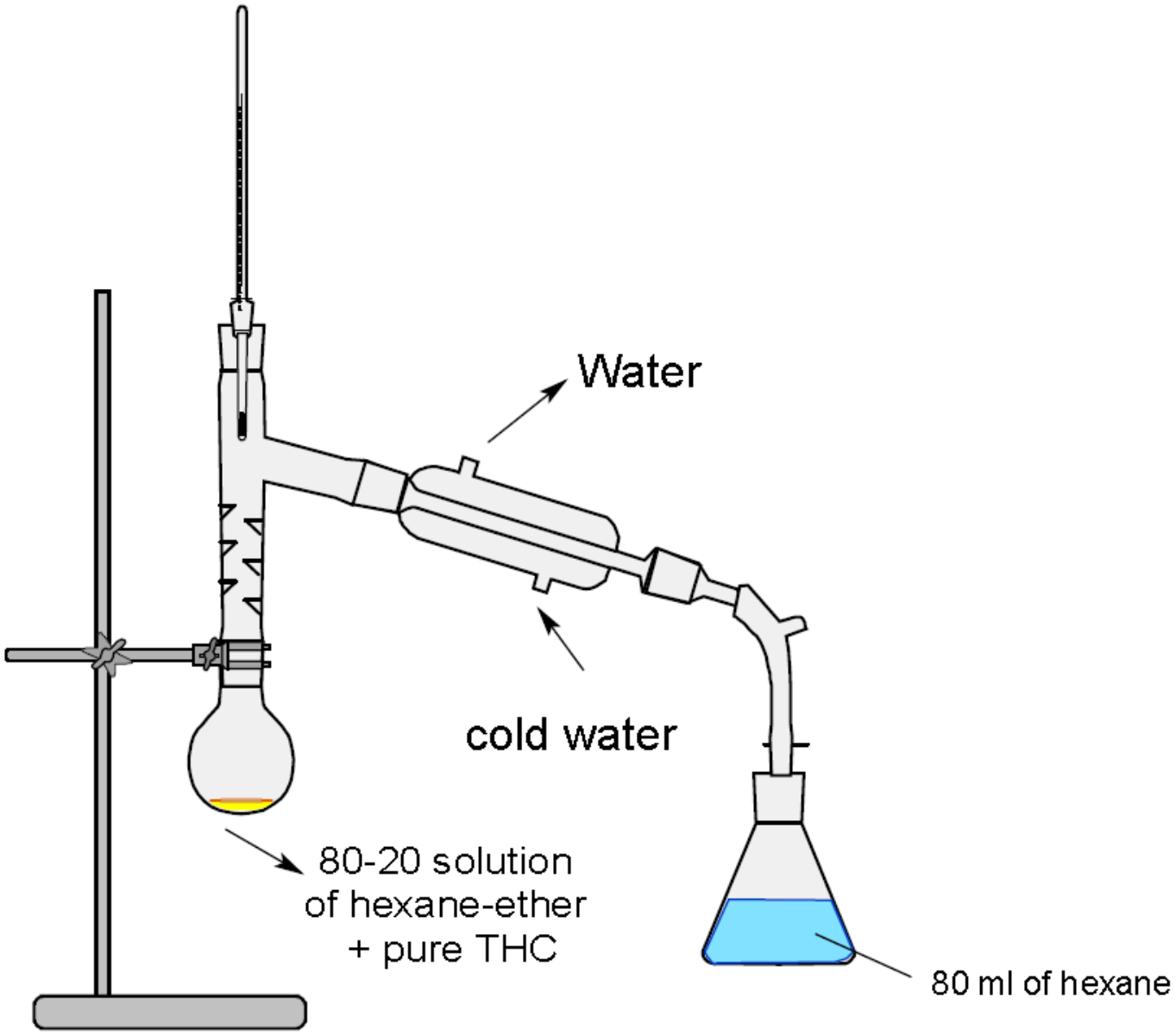
Step 4:

Evaporate the last fraction to give 1.2 g of THC-HS (98% yield) either by spontaneous evaporation under hood at room temperature or by distillation of the solvent (mixture of ether –hexane).The final product THC-SH will be obtained in 98% yield.


hexane
Silica gel
elute with 100 ml of
hexane
by gravity
Silica gel
hexane
fraction

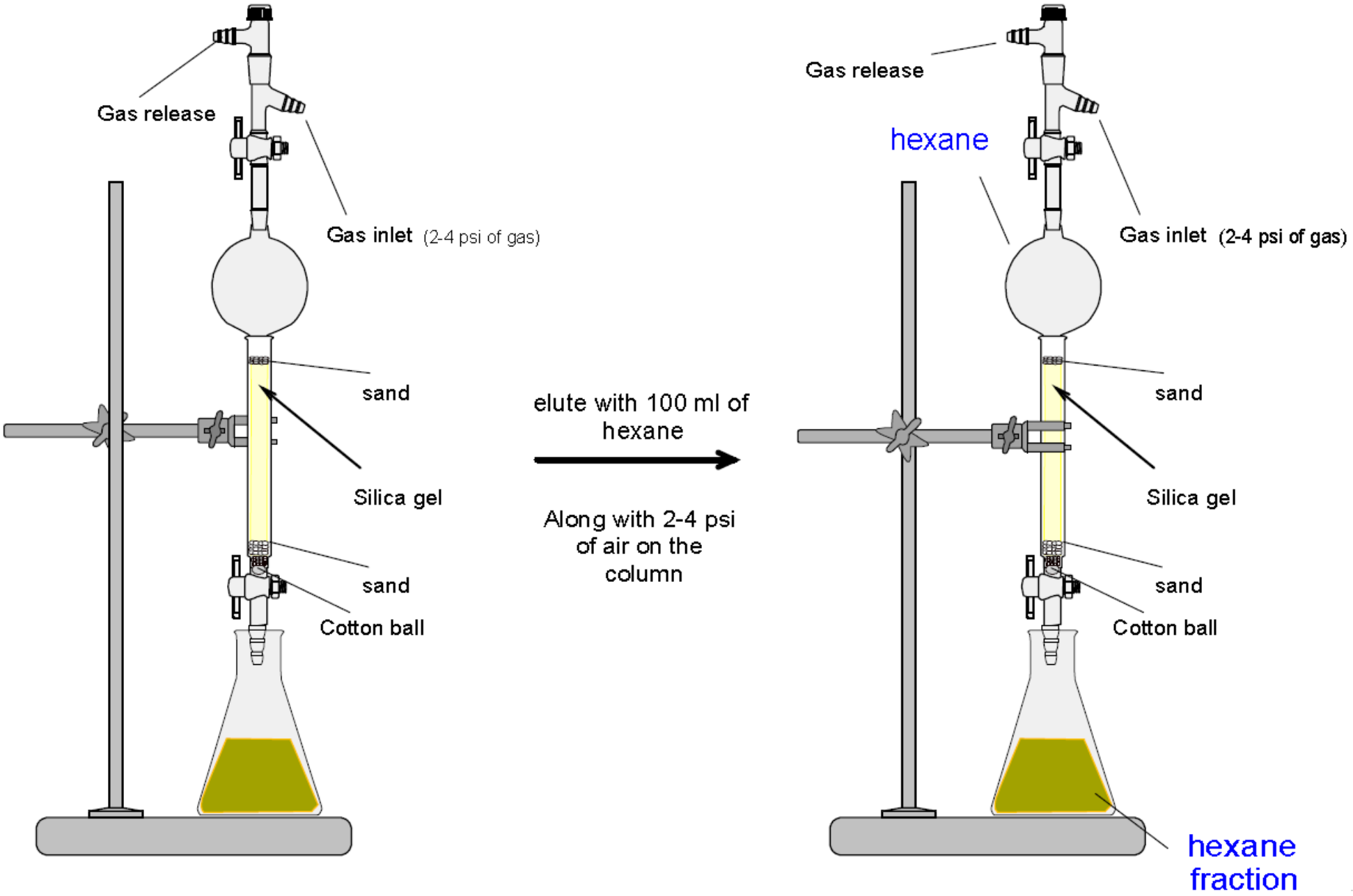

95:5
hexane-ether
elute with 100 ml of
95:5 mixture of
hexane-ether
Silica gel
elute with 100 ml of
90 : 10 mixture of
hexane-ether
hexane
fraction

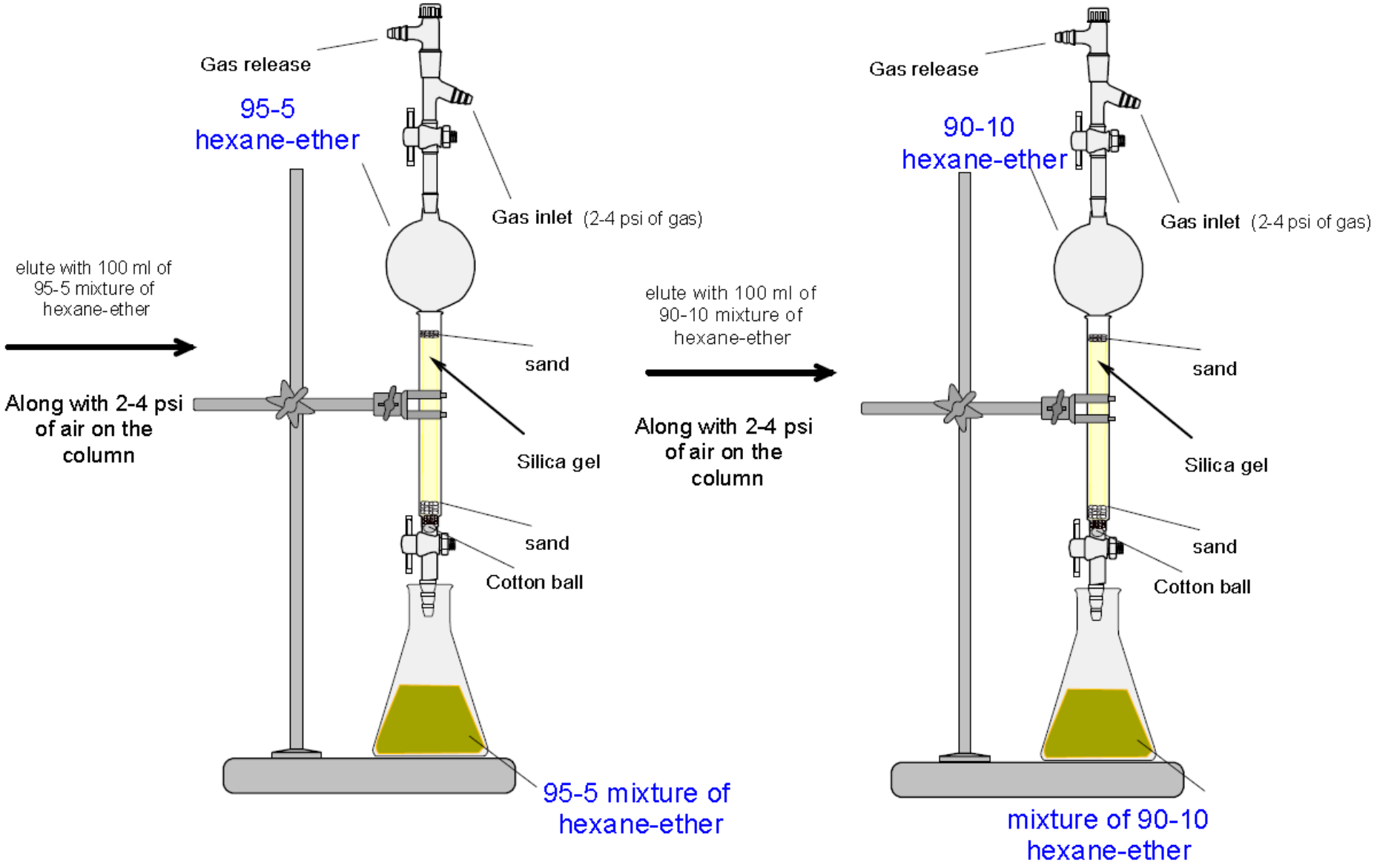

90 - 10
hexane-ether
Silica gel
90 : 10 mixture of
hexane-ether
elute with 100 ml of
80-20 hexane-ether
80-20
hexane-ether
Silica gel
80 : 20 mixture
of hexane-ether


Water
cold water
80-20 solution
of hexane-ether
+ pure THC
80 ml of hexane

Step 5:

Note: If the separation analysis is done by HPLC (High performance Column Chromatography) the purity would be even more than 98%. The detailed procedure and instructions has come as follows. Care must be taken that the air pressure on the column should not exceed 7 psi due to threat of fracture in column.


Gas release
Gas inlet (2-4 psi of gas)
sand
Silica gel
sand
Cotton ball
elute with 100 ml of hexane
Along with 2-4 psi of air on the column
Gas release
hexane
Gas inlet (2-4 psi of gas)
sand
Silica gel
sand
Cotton ball
hexane fraction


Gas release
95-5
hexane-ether
Gas inlet (2-4 psi of gas)
elute with 100 ml of
95-5 mixture of
hexane-ether
Along with 2-4 psi
of air on the
column
sand
Silica gel
sand
Cotton ball
95-5 mixture of
hexane-ether
elute with 100 ml of
90-10 mixture of
hexane-ether
Along with 2-4 psi
of air on the
column
Gas release
90-10
hexane-ether
Gas inlet (2-4 psi of gas)
sand
Silica gel
sand
Cotton ball
mixture of 90-10
hexane-ether

Yield percent of the reaction:

From 1 gram of the starting material of THC (Molecular weight of 314.469) the 100% yield of THC-HS would be:

Weight of THC-HS = 1gr x 356.469(MW of THC-HS)/314.469 = 1. 133 g

The final amount of THC-HS will be obtained as 1.133 x 98/100 = 1.11 gr which is 98% yield.

Note- The picture below is a sample of electrical heater that can be used in steps 2 & 5 for distillation.