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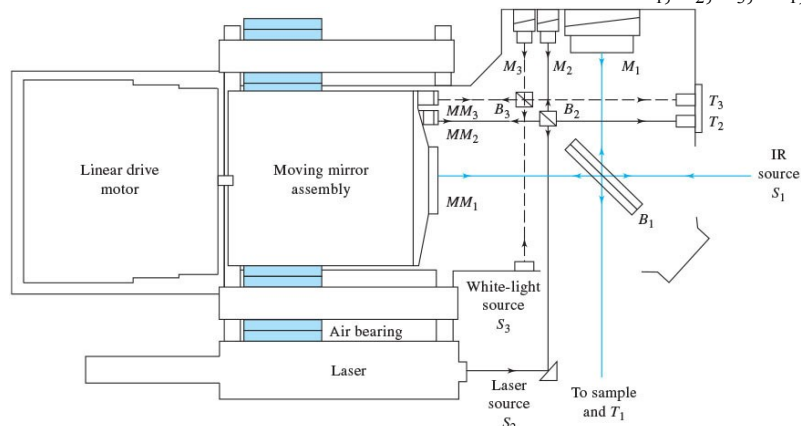
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Analytical Chemistry II – Quiz (23rd April, 2024)

1) What is chemiluminescence? What instrumentation do we need to measure chemiluminescence?

Chemiluminescence is produced when a chemical reaction yields an excited species that emits light. Instrumentation for chemiluminescence detection is simple. The main part is typically photomultiplier tube, while monochromator is not required.

2) The drawing shows interferometer system of a modern FTIR instrument. Explain the principle of its operation. Mention the functions of the elements labeled as S_1 , S_2 , S_3 , M_1 , M_2 , M_3 , MM_1 , MM_2 , MM_3 , B_1 , B_2 , B_3 .



This FTIR instrument takes advantage of three Michelson interferometers to record three interferograms. During its operation, the moving mirror assembly is moved. The beam from S_1 is split in B_1 , reflected from fixed mirror M_1 and movable mirror MM_1 , and the merged beams undergo interference between B_1 and sample. This way, IR interferogram is created, which can later be converted to IR spectrum. S_2 , B_2 , M_2 , and MM_2 are used to produce laser-fringe signal, to know the exact position of the moving mirror assembly. S_3 , B_3 , M_3 , and MM_3 are used to record white light interferogram, to know the position of the moving mirror assembly that corresponds to zero retardation.

S_1 – IR source used for recording IR interferogram/spectrum of the sample

S_2 – laser source used to record laser-fringe signal, to know the exact position of the moving mirror assembly

S_3 – white light source used to record white light interferogram, to know the position of the moving mirror assembly that corresponds to zero retardation

M_1 – fixed mirror used for recording IR interferogram/spectrum of the sample

M_2 – fixed mirror used to record laser-fringe signal, to know the exact position of the moving mirror assembly

M_3 – fixed mirror used to record white light interferogram, to know the position of the moving mirror assembly that corresponds to zero retardation

MM_1 – movable mirror used for recording IR interferogram/spectrum of the sample

MM_2 – movable mirror used to record laser-fringe signal, to know the exact position of the moving mirror assembly

MM_3 – movable mirror used to record white light interferogram, to know the position of the moving mirror assembly that corresponds to zero retardation

B_1 – beamsplitter used for recording IR interferogram/spectrum of the sample

B_2 – beamsplitter used to record laser-fringe signal, to know the exact position of the moving mirror assembly

B_3 – beamsplitter used to record white light interferogram, to know the position of the moving mirror assembly that corresponds to zero retardation