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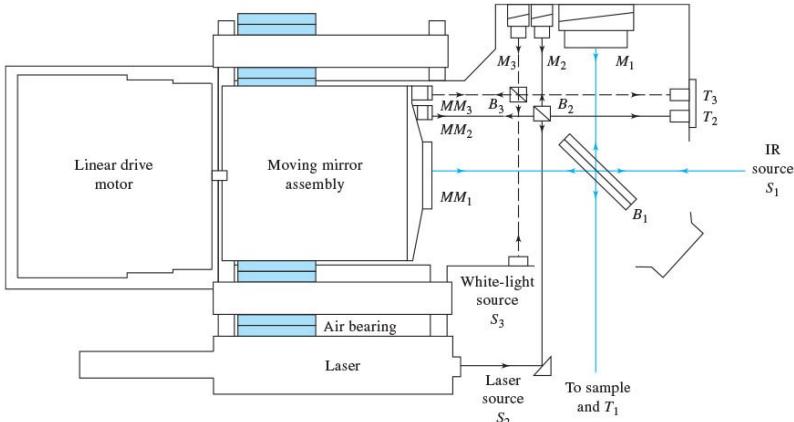
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Analytical Chemistry II – Quiz (23rd April, 2024)

- 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