accompanied by weaker bands at higher frequency side provide further evidence of their thiocyanate structure. The NCS bending frequency for isothiocyanates[10,11] lies in the range 450–490 cm^{-1}.

Besides C–S stretching frequency and NCS bending frequency, confirmation regarding the bonding through sulphur atom can be obtained from the values of CN stretching frequency which are lower for M-NCS complexes as compared to M-SCN complexes[14–16]. The presence of sharp bands at 2200 cm^{-1} (table 2) provides further indication of M-SCN bending in the prepared complexes.

Although both normal cyanates and isocyanates show asymmetric stretching band in the same region 2200–2300 cm^{-1}, the symmetric stretching band is quite different for them. The isocyanates have symmetric stretching frequency, ν_s(NCO) in the region 1400–1320 cm^{-1} whereas this band appears below 1200 cm^{-1} in the normal cyanates[17–20]. The appearance of medium intensity bands around 1300 cm^{-1} in the IR spectra of the prepared complexes clearly show that the bonding is through nitrogen *i.e.* M-NCO rather than M-CNO. Hence the cyanate complexes prepared are true isocyanates bonded through nitrogen.

The azide group in the complexes $WO(OR)_2(N_3)_2$ is confirmed by the appearance of characteristic asymmetric N–N–N stretching frequency[21,22] around 2100 cm^{-1} (table 2). The two bands in the spectral range 580–665 cm^{-1} are due to doubly degenerate azide bending motion.

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SOME TYPICAL PLATELET FORMS OF GEL GROWN BARIUM MOLYBDATE CRYSTALS

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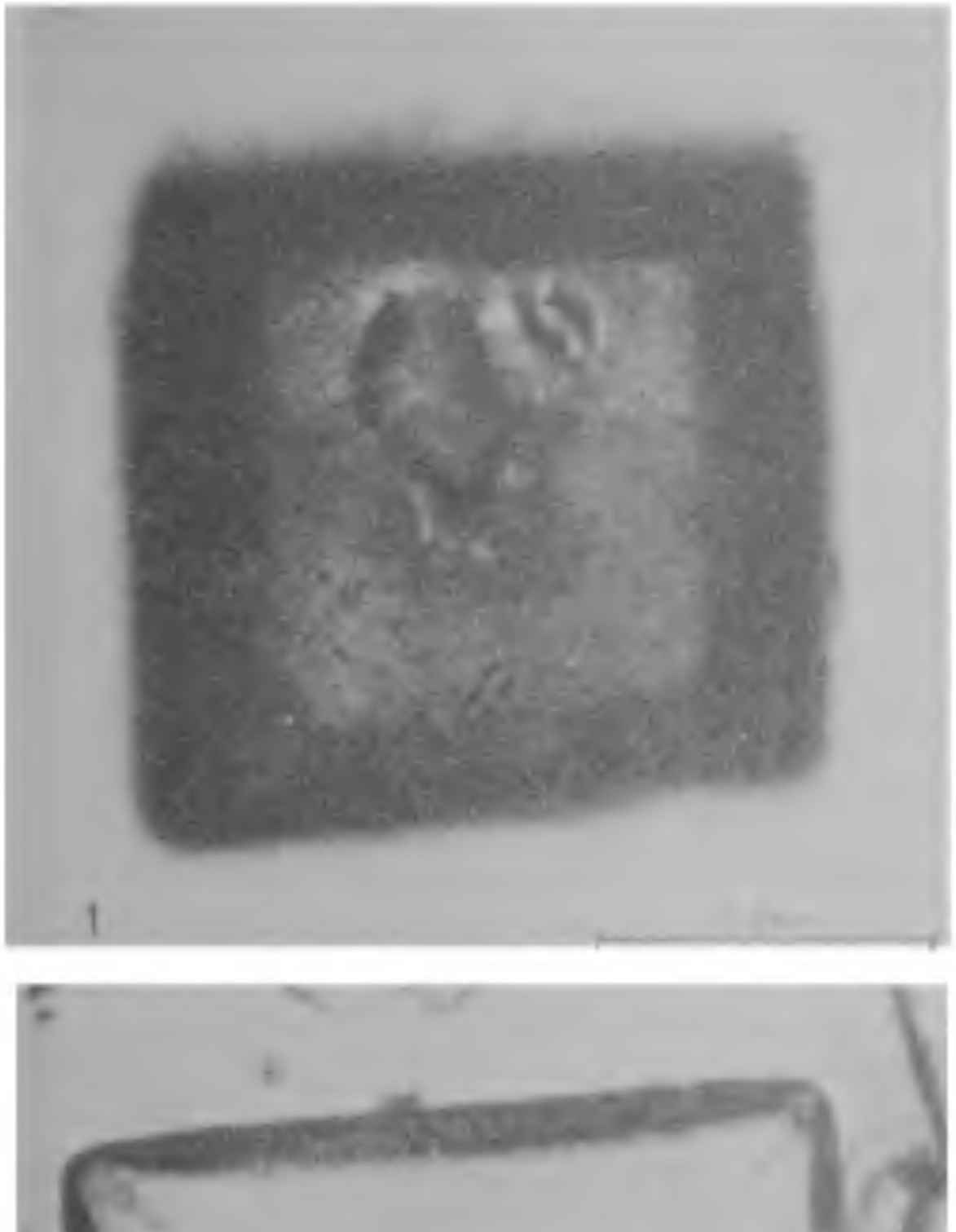
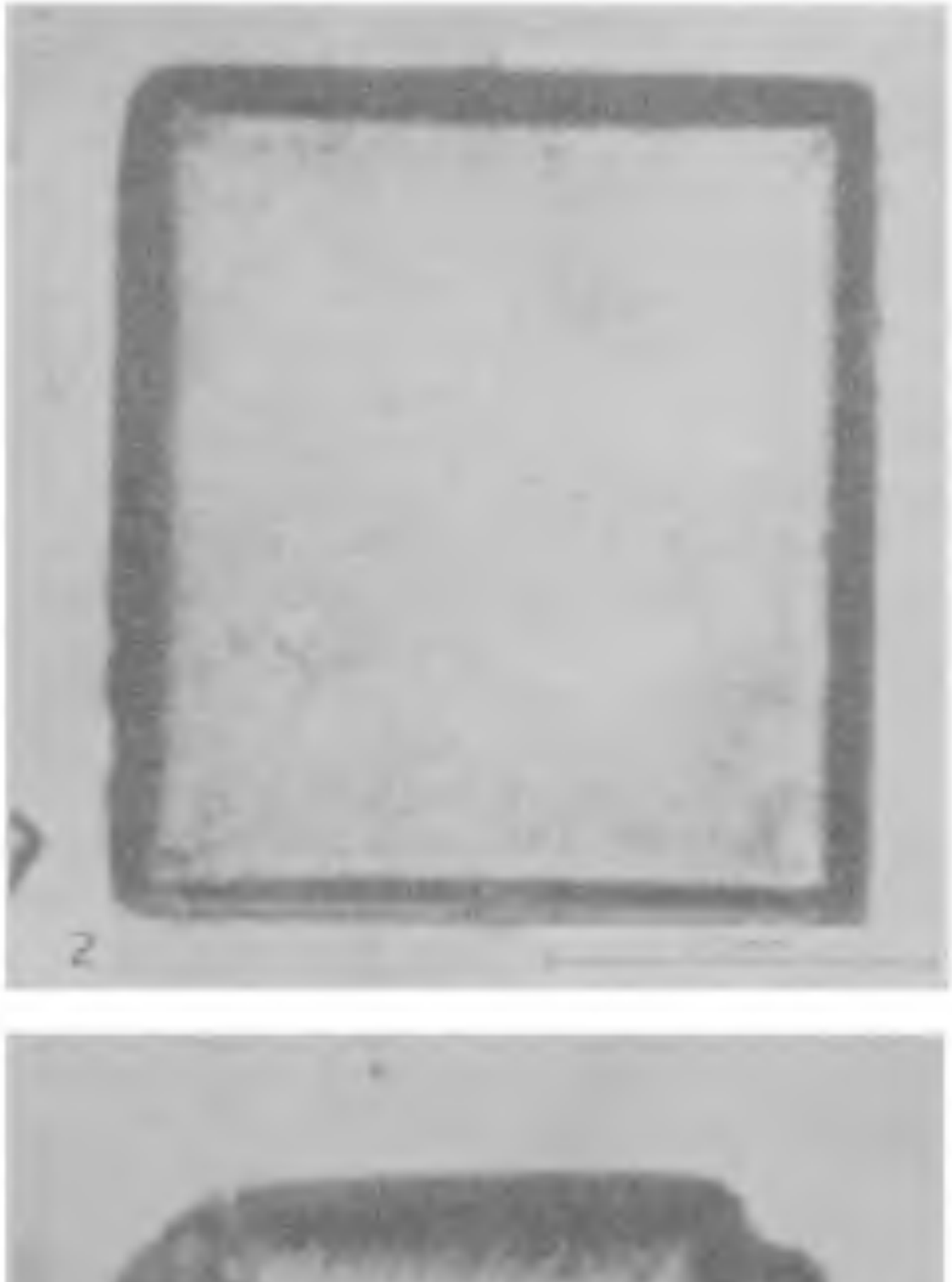
BARIUM molybdate is an important crystal for laser studies[1]. It has no natural occurrence, hence its growth and investigation on habit modification would be of great significance for better understanding of its physical properties. We have investigated the growth of this crystal in silica gel systems[2]. The present paper gives a brief account of the typical platelet crystals grown in silica gel under some strictly controlled growth conditions.

Single and double diffusion techniques were attempted. Double diffusion technique could yield various habits in conglomeration, *viz* tetragonal bipyramidals and its modified forms. Single diffusion tech-

nique was an ideal technique for the harvestation of the above cited forms. Silica gels of pH between 6 and 7 impregnated with ammonium molybdate solution of concentration 0.005 M to 0.01 M, were prepared in single test tubes of size 2 cm diameter and 15 cm height. Solutions of barium nitrate with concentration 0.05 M to 0.1 M were poured over the gels.

$BaMoO_4$ crystals of platelet or tabular forms were only crystallised in the gel medium due to the single diffusion of Ba^{2+} ions and associated chemical reaction with MoO_4^{2-} ions. Ultimate size was attained within 2 weeks. We have optimised the growth con-





Figures 1–4. 1. A fully developed thick platelet with fully developed (001) face and (011) sides. **2.** A large thin platelet with bevelled sides, (001) surface fully developed, (011) sides not developed. **3.** A large thin platelet with small grooves at the corners and on (001) surface. **4.** A thick platelet with fully developed deep grooves at the corners, (001) surface fully developed, (011) surfaces grounded.

ditions, and found that (1) the pH (2) the concentration of reagents and (3) the impurity play significant role as habit modifiers. The concentrations of outer and inner electrolytes in this case were tremendously decreased and tabular forms of the uniform crystals, almost the same size were found throughout the gel medium. Figures 1–4 represent the types of platelets formed.

Shape imparted to a crystal by the relative development of its various faces is referred to as habit. A crystal may be considered to have undergone a change of habit of face; one or more forms disappear or appear or if their relative sizes change in response to a change in the growth parameters. Barium molybdate system comes under the scheelite group[4], which therefore assumes the habit and morphology of the tetragonal system. The forms of tetragonal system are far less numerous than those of isometric. Common tetragonal mineral habits are square prisms, square prisms with pyramids, or bipyramidals. Tetragonal bipyramidal form is the ideal shape of $BaMoO_4$ crystals, and tabular form is a closed form of tetragonal system defined by (001) and (011) faces. Platelet or tabular forms of crystals are very useful for various scientific equipment and applications. Tabular habit indicates[4] strong periodic bond chains, parallel to two or more directions and its growth conditions are governed by low supersaturation. In the present case also the tabular forms are grown under low super saturation. Hence role of concentration of reacting solution as habit modifier is quite relevant in the present case also.

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OCCURRENCE OF *AZOTOBACTER CHROOCOCCUM* IN *POTHOS SCANDENS*

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In this note we report the intracellular detection of *Azotobacter chroococcum*, a free-living nitrogen fixer in *Pothos scandens*, commonly known as the money plant which can grow in plain water.

After initial cleaning of different plant parts with cotton using sterile distilled water containing a natural detergent like soap-nut, subsequent surface disinfection was achieved by rubbing the surface quickly with cotton swab soaked in 75% ethanol.

When transverse sections were observed under light microscope, parenchymatous cells of the cortex, especially those near the central and peripheral vascular bundles were found to be teeming with microbial cells whose movement was arrested on addition of 75% alcohol or 0.1% $HgCl_2$ from the side of the cover glass. Morphologically they appeared coccoidal in nature occurring singly and in pairs. Sections from leaf, stem and root showed similar types of bacteria.

After surface disinfection, different plant parts were macerated in sterile saline using glass powder. The homogenate obtained was streaked over nitrogen-free Ashby's mannitol agar, yeast extract mannitol agar and reinforced clostridia agar[1]. Petriplates inoculated with 2–3 loopfuls revealed characteristic colourless pure gummy colonies almost covering the whole of the plate of Ashby's mannitol agar.

The bacterium appeared to be a capsulated, non-sporulating, aerobic, motile, gram negative ovoid to rod shaped bacterium. Colonies were found to be raised, medium size, round, smooth, colourless, transparent, with the entire edge and mucoid in nature. An isolate was found to utilize glucose, mannitol, sucrose and starch but not rhamnose. Additionally, this isolate was found to be urease and catalase-positive. Following Bergey's Manual[2], the isolate has been identified as a variant of *A. chroococcum*.

Aerial clinging roots were relatively rich in *Azotobacter* (3 to 6×10^4 cells/mg the fresh tissue) while the apical leaf, lateral leaf, stem and root had fewer cells (2 to 6×10^2 cells/mg the fresh tissue).

When fresh apical leaves and aerial clinging roots were checked for their acetylene reduction capacity[3], leaves and roots showed ethylene in the range of 4–12 and 7–10 nmol of C_2H_4/hr/g of fresh weight respectively. Nitrogenase activity of isolated *Azotobacter*