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A cost-effective apparatus for colloidal assembly by convective deposition

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The apparatus is based on the blade coating technique which is simple and economical compared to the other. The blade is attached to the substrate at an angle of 10-90 degrees and the polystyrene-beads solution is dropped in between. The whole system is then in the humidity-control box. The blade is moved by a stepping motor with the resolution of 3 μm/s and is also vibrated using a piezoelectric actuator. This vibration helps the polystyrene beads align hexagonal-close-packed. By microscopic examination, the hexagonal-close-packed monolayer of the polystyrene bead is found in extensive areas of order 10 mm^2.

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