# CHAPTER I
# INTRODUCTION

In oil and gas production, pressure inside a reservoir is considerably higher than the bottom hole well-bore pressure and crude oil is driven toward the well and up to surface by this differential pressure. However, as the reservoir pressure decreases because of the production, it becomes necessary to maintain the pressure inside the reservoir to achieve the maximum production and ultimate recovery; the procedure is commonly called enhanced oil recovery (EOR). One of the main enhanced oil recovery techniques is water injection. Sea water with high sulfate concentration is often injected and when contacted with formation water containing high concentrations of $Ca^{2+}$, $Ba^{2+}$ and $Sr^{2+}$ mineral scales form due to their incompatibility. Such scales precipitate and deposit on the surface of material causing plugging in pipelines and reduced well productivity. Barium sulfate ($BaSO_4$) is one of the scales that cause significant problems since it has very low solubility in almost all solvents, as compared to other inorganic scales. This had led scientists and engineers to study the formation of barium sulfate scale more closely. Many previous studies have focused only on precipitation of barium sulfate in bulk solution but not on the surface and most of the work on deposition are not fundamentally sufficient in understanding the mechanism of $BaSO_4$ deposition. Thus, the purpose of this work is to investigate precipitation of barium sulfate on the surface of capillary by using a new technique to measure the capture efficiency.