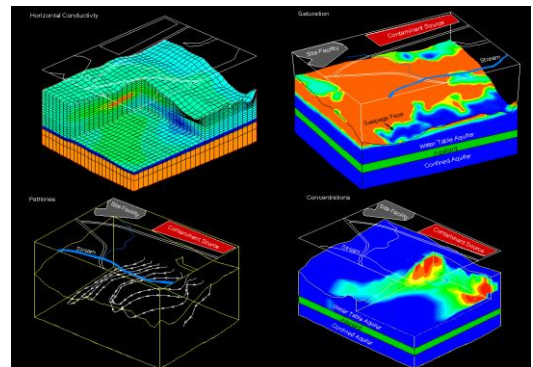




# ChemSim-Oilfield Chemical Flooding and Profile Control Simulation Software System

ChemSim is the latest generation of specialized software for three-dimensional multiphase, multicomponent, non-isothermal oilfield chemical flooding and profile control, jointly developed by the IUT Group in the U.S. and the University of Texas at Austin (UT Austin). It is currently the only professional software internationally that integrates both oilfield chemical flooding and profile control functionalities.

**Software Functions:** ChemSim can be used for oilfield polymer flooding, surfactant flooding, binary and tertiary composite flooding, strong/weak gel system flooding (with organic and inorganic cross-linking agents), Preformed Particle Gel (PPG), Colloidal Dispersion Gel (CDG), simulations of polymer and PPG or CDG combinations, tracer simulations, and more. The flexible setting of software parameters is conducive to laboratory optimization research and improve the accuracy of numerical simulation.

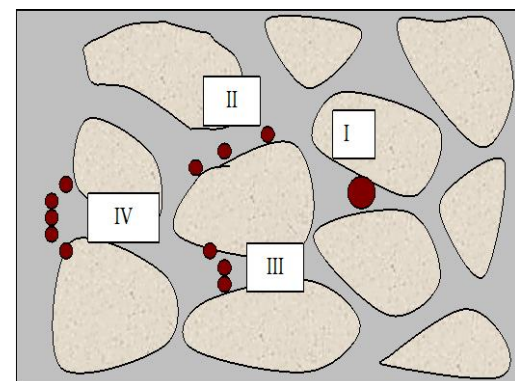


## Technical Advantages of ChemSim

ChemSim is capable of conducting numerical simulation studies for various profile control methods, taking into account the important physicochemical phenomena during the polymer profile control process. The descriptions of physicochemical parameters in the model are well-supported by extensive laboratory data, and all parameters have clear physical meanings.

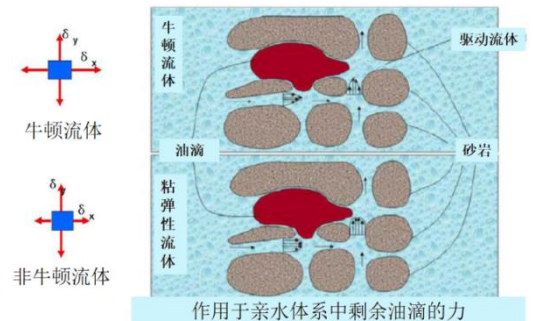
1. **Model Building Module:** ChemSim includes a comprehensive preprocessing module that allows users to create detailed three-dimensional geological models.

2. **Viscoelastic Polymer Module:** This module provides functionalities for selecting polymer formulations, optimizing polymer flooding development methods, studying the mechanisms of polymer flooding, tracking polymer flooding simulations, and providing guidance for selecting surface equipment.



3. **Polymer/Gel Module:** This module focuses on interlayer/intralayer profile control studies, research on flooding of predominant channeling zone in oilfield, gel type selection, gel quantity calculations, injection concentration studies, and optimization of different segment plugs.

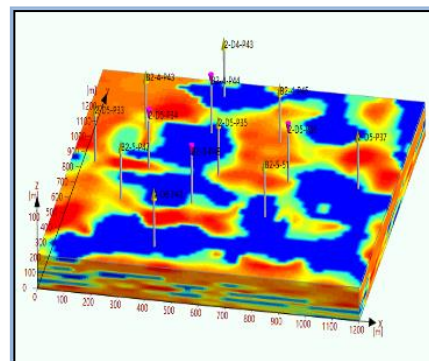
4. **PPG Module:** This module introduces quantitative



simulations of particle transport and expansion, allowing particles to expand in deeper reservoir sections to control excessive water influx through predominant channeling zone.

5. CDG Module: CDG(Colloidal Dispersion Gel) is created by adding a small amount of cross-linking agent and stabilizer to a low-concentration polymer solution, forming a weak gel system characterized primarily by intramolecular cross-linking with some intermolecular associations, forming a non-three-dimensional network structure.

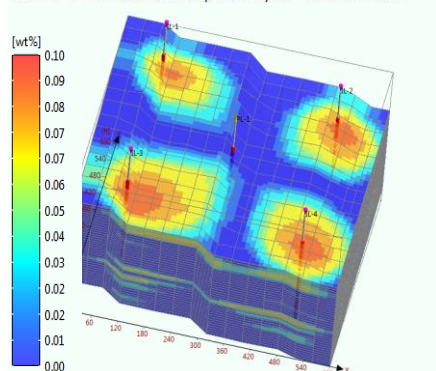
6. Three-Dimensional Imaging Display Module: In addition to numerical simulation calculations, this module can process simulation results, featuring three-dimensional display functions for model post-processing and two-dimensional curve visualization.



## Technical Advantages

- Specialized Software for Chemical Flooding: ChemSim is a professional simulation software specifically designed for chemical flooding and profile control, with options for binary and tertiary composite flooding.
- Innovative Quantitative Simulation: ChemSim is the first software to introduce quantitative simulations of particle transport and expansion. As a three-dimensional, three-phase, multicomponent numerical simulator, it features critical modules for simulating the flow of

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Preformed Particle Gel (PPG) and Colloidal Dispersion Gel (CDG) as well as a polymer viscoelasticity module—elements that are lacking in similar software but hold significant application value.

- Robust Parameter Settings: The parameter settings are based on extensive laboratory data and are validated through repeated testing to develop reliable mathematical models.
- Good Interoperability: ChemSim interfaces well with other general-purpose software, ensuring effective data interchange and compatibility.

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