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The Formation of Structure in the Extraction at Vibration in an Interfacial Layer

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Formation of cruds at the extraction of metals is the negative phenomenon as reduces the rate of extraction, worsens disintegration of the emulsions, and leads to loss extragent and an extractive element. In practice to prevent the formation of structure in an interfacial layer in system aliphatic alcohols add to aliphatic alcohols, for example, octanol - 1. However there are additional losses extragent, threat of environment increases.

The results of researches on influence of the mechanical vibrations on an interface on process of the formation of structure in an organic phase at extraction rare-earth elements by solutions di-(2-ethylhexyl)phosphoric acid are considered.

Vibration influence on interfacial layers was carried out by means of the vibrator which represented a high-frequency electrodynamic head with rigidly fixed core, by a coming to an end vibrating element in the form of the triangular prism turned to an interface by top. The vibrator connected to the generator of low-frequency signals.

The effective viscosity and limiting pressure of shift of organic phase exposed to vibration is constant during first ~15 min. At short time (~5 min), the main contribution in system behavior is provided by spontaneous surface convection. At longer time intervals (50–60 min) when spontaneous surface convection is absent, it is the vibrations that disintegrate the resulting structure. The supply of additional energy into interfacial layers of extraction system changes the hydrodynamic situation not only in interface region but also in the adjacent domains of contacting phases. The relative motion of particles increases when exposed to mechanical action. Since resulting particles have different weight and move with different velocity, their shift leads to is integration of aggregates in temporary structure. Thus, mechanical vibrations disintegrate the structure at the weakest coagulation contacts.

However, the viscosity and a limiting pressure of shift of organic phase sharply increases with time. The nascent temporary structure is heterogeneous, therefore the supply of additional energy leads to its disintegration and particles of smaller size prevail in the system. The interaction of reproduced particles results in the formation of a stronger structure.

Thus, the local supply of mechanical energy in an interface layer possible to suppress process of the formation of structure during the initial moments of time.

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