Effect of Flocculating Agent Concentration on the Flocculation Efficiency

METHOD
Several experiments were made by introducing different quantities of alumina sulphate in a suspension of titanium dioxide at 10 g/l.

For each alumina sulphate concentration, the Turbiscan ONLINE follows the evolution of the backscattering light intensity in real time. The time $T_0$ corresponds to the moment when we introduce the flocculating agent.

RESULTS
Figure 1, we can see that the backscattering is decreasing as a function of time. It corresponds to the flocculation of the particles (particle size increase) due to the introduction of flocculating agent. The more alumina sulphate is added, the quicker and the more complete the flocculation is (big floc sizes).

Figure 1.
To compare the initial speed of flocculation as a function of flocculating agent concentration, we calculate the slopes of kinetics (on 2 seconds : Table 1).

<table>
<thead>
<tr>
<th>Alumina sulphate concentration (g/l)</th>
<th>Initial flocculation speed (deltaBS/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.018</td>
<td>16</td>
</tr>
<tr>
<td>0.021</td>
<td>18</td>
</tr>
<tr>
<td>0.029</td>
<td>176</td>
</tr>
</tbody>
</table>

Reproducing this measurement for a range of flocculating agent concentrations and measuring for each one the steady state backscattering level, we obtain the curve represented in Figure 3.

It enables to determine the critical flocculation concentration: 0.018 g/l (concentration for which the flocculation is induced) and the saturation flocculation concentration: 0.030 g/l (the minimal concentration for which the flocculation is complete.)

**SUMMARY**

The Turbiscan ONLINE is able to follow flocculation phenomena in real time, with a high acquisition frequency (0.1 s). It enables to compare the effects of flocculating agents concentrations or nature on the efficiency of the process.